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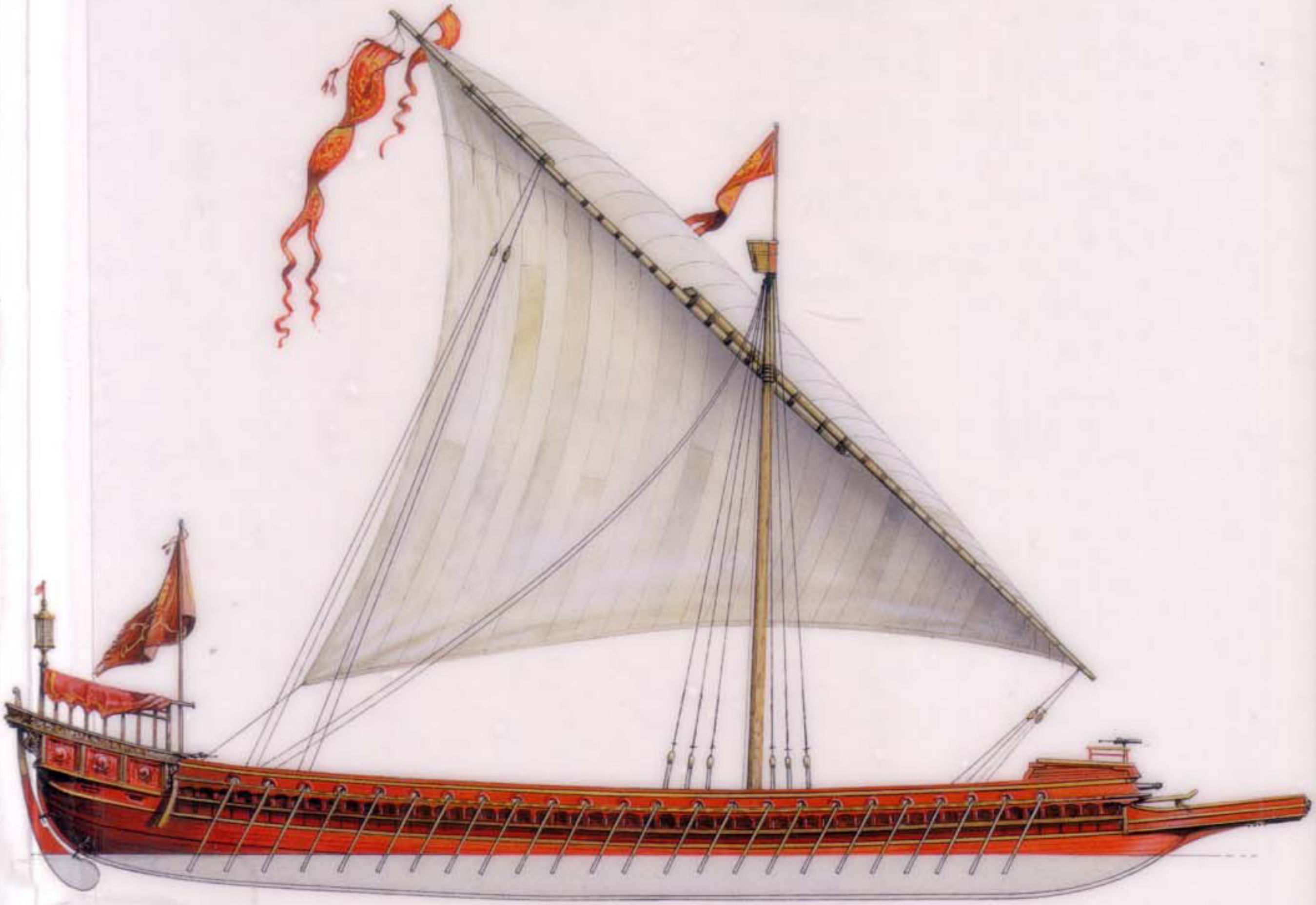
Renaissance War Galley 1470–1590



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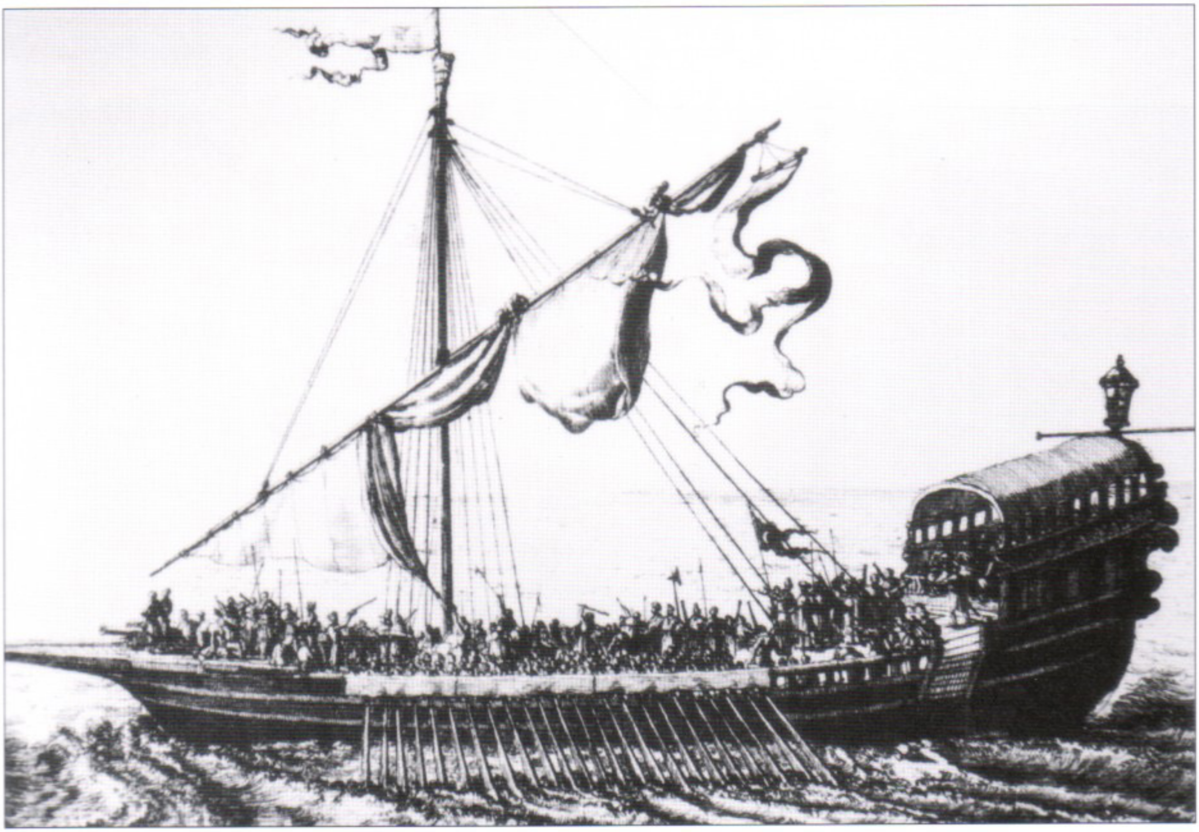
THE RENAISSANCE WAR GALLEY 1470–1590

INTRODUCTION

The emergence of the war galley was a phenomenon which was virtually unique to the Mediterranean Sea, although galleys did occasionally make an appearance in Atlantic waters, and a separate Baltic galley tradition continued to develop as a distinct entity. The designs of the triremes used by the Ancient Greeks, and the biremes of the Romans, were influential in the development of the Byzantine *dromon* during the 5th century AD, and these in turn continued the tradition of using galleys as warships in the region for almost another millennium. This tradition gave way to a use of a derivative galley type in Italy during the medieval period, while a similar tradition developed in the Muslim east.

By the 14th century war galleys had become the principal type of warship found in the fleets of the maritime powers of the Mediterranean basin. Just over a century later the introduction of heavy (gunpowder)



A Barbary Coast corsair galley of the mid-16th century. These craft were lighter and faster than most of their contemporaries, but they lacked the disciplined soldiers carried on regular Ottoman war galleys, or the heavy ordnance mounted on their Christian counterparts.

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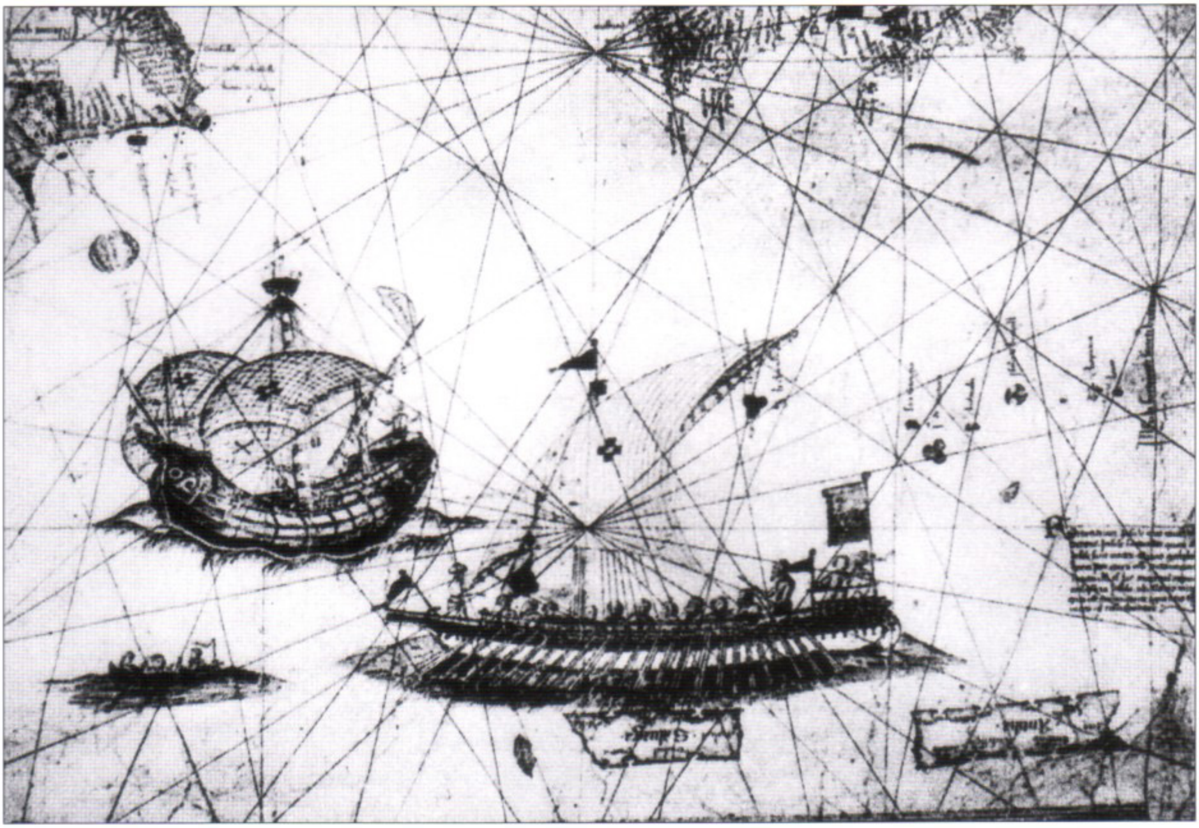
artillery onto war galleys altered the naval balance, causing a minor revolution in tactics, galley design and strategic thinking. For well over two centuries, from the mid-15th century until the mid-17th century, galleys remained the arbiter of naval supremacy in the region, and these oared warships were thrust to the forefront of the clash between Christianity and Islam. This religious struggle was principally fought between the Republic of Venice on the one hand and the Ottoman Turkish Empire on the other, and the struggle reached a climax with the great galley battle of Lepanto, fought in 1571. Unlike the galley fights of the ancient world, tactics revolved around gunfire and boarding rather than ramming. The Christian ordnance proved decisive, emphasising the growing importance of gunnery in naval warfare.

This book traces the development of these Renaissance war galleys, and demonstrates the important part played by artillery in shaping the nature of galley warfare and warship design during the 16th century. It also traces the developing trends in galley construction, and outlines the way these fragile but powerful warships were manned, equipped and fought. Although the basic galley design was virtually the same throughout the Mediterranean, different maritime powers used their galleys in slightly different ways, as tactical or strategic planning dictated. These variants will be explored, as will the nature of the range of variants on the basic galley design, from the tiny *bergantine* to the large but cumbersome galleass. Each type had its use, and together they created a homogeneous fleet of oared warships, the like of which the world has never seen since.

A Portuguese galley and a caravel, depicted during a voyage of exploration. Detail from the map of Gratioso Benincase, 1482. (Collection of the Biblioteca, University of Bologna)



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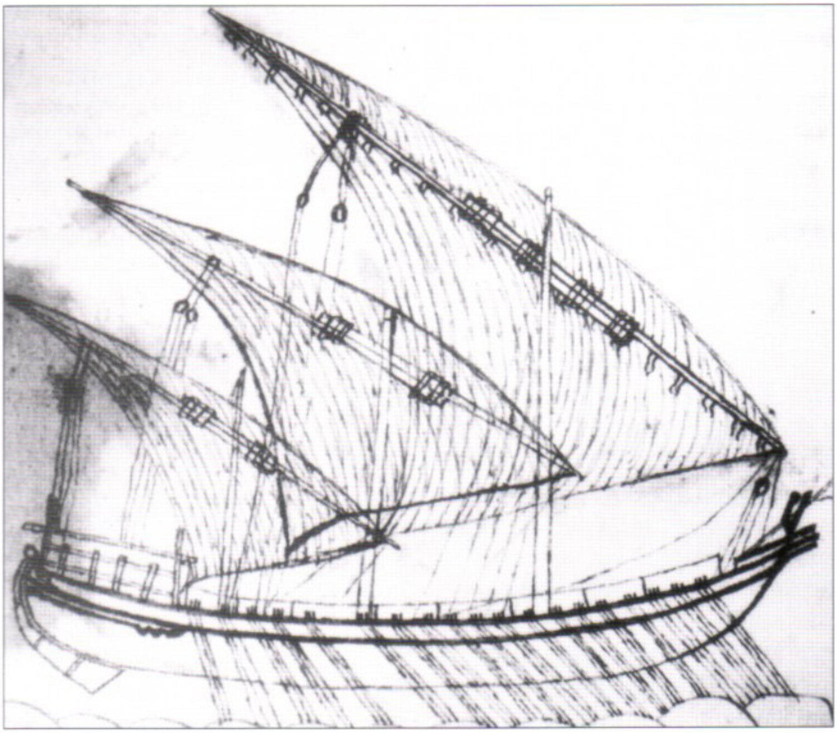
THE DEVELOPMENT OF THE MEDITERRANEAN WAR GALLEY

Galleys have existed in the Mediterranean longer than recorded history. The real roots of the war galleys of the Renaissance can be traced back to the Byzantine *dromon* and Arabic *shelandi* which operated in the Eastern Mediterranean for centuries. Unfortunately little is known about these craft though they clearly served as a stylistic bridge between the ancient and the Renaissance galleys. Illustrations of *dromons* dating to the 12th century exist, proving that these ships were biremes, with upwardly curving stemposts, and a ram extending above the waterline at the stem. The Greek term *dromon* means 'runner', which emphasises that these craft were built for speed, and pictorial evidence suggests they carried around 24–26 oars per side, arrayed in two banks. Byzantine fleet manuals indicate that these craft came in a variety of sizes, from the *chelandion* (large *dromon*) with a crew of 200 oarsmen (two or three per oar), to the *moneres* or *galea*, which were smaller types of oared vessel, with a smaller crew. There is evidence that the Arabs adopted the term *dromon* themselves, although the *shelandi* was the correct term for their principal oared warship. A combination of scholarly research (Gardiner and Morrison, *The Age of the Galley*, 1995) and an examination of Byzantine naval manuals reveals that the typical *dromon* had an overall length (excluding the ram) of around 35 metres (120 feet), with a beam of less than six metres (20 feet). These craft were all equipped with a single mast and a triangular sail, known in Europe as a lateen sail, as it was first seen in use on the ships of the 'Latins' (Byzantines).

A Venetian *galia grosse*, or merchant galley, from a mid-15th century Venetian manuscript. She employed the *alla sensile* rowing system, where oars were grouped in threes. Her suite of sails is far greater than that of later, purpose-built war galleys. (British Library)



The sack of Constantinople in 1204 at the hands of the crusaders led to a virtual collapse of Byzantine naval power, and the consequent rise of the naval strength of the Latin Crusader states and the Italian maritime city states. While little is known of these crusading galleys, we can trace the development of the medieval Italian galley with some degree of certainty.

Specifications for a galley built for Charles I of Anjou, King of Sicily (1266–84), describe a vessel of almost 40 metres (130 feet) in length, with 54 oars per side, with two oarsmen per oar. She was armed with iron rockets capable of shooting 'Greek Fire' (an incendiary weapon), and was clearly designed as a

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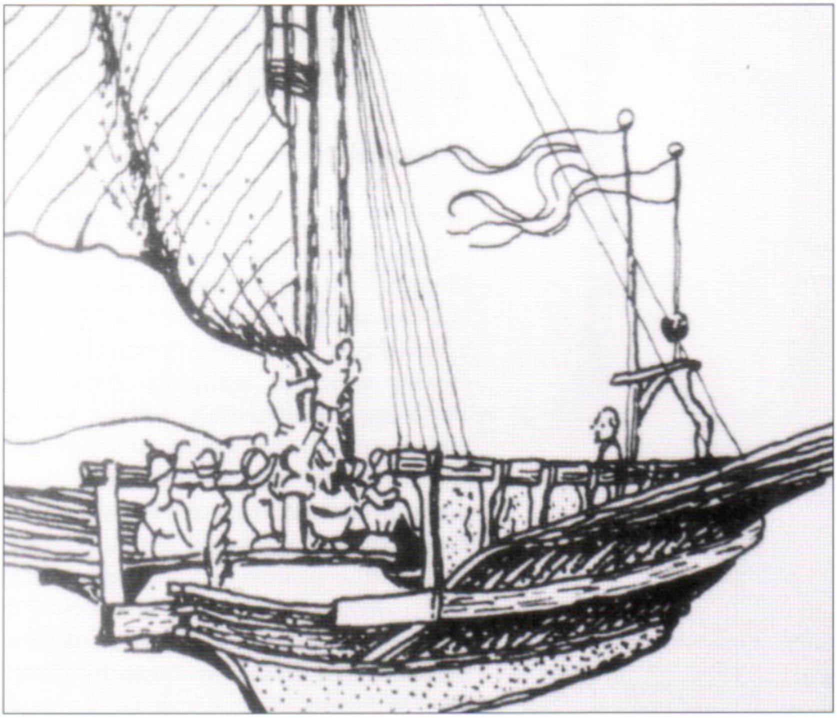

A Venetian *galiot* or *fusta* under sail, in a sketch attributed to Raphael (1483–1520). Note the way the oars are raised while the vessel is under sail, the oars resting on specially designed supports fitted to the hull. It appears that each oar was pulled by two oarsmen. (British Library)

flagship vessel for the Kingdom of Sicily. A Catalan *Atlas* dated 1370 depicts a small oared warship (probably from the Kingdom of Sicily) with a raised poop deck and a single lateen sail. A long tradition of Byzantine influence in Sicily and southern Italy clearly left its mark, as both of these vessels are similar to the later Byzantine *dromons* found further east. Similar galleys were ordered from a Sicilian shipyard by Louis IX of France ('St Louis', 1226–70) for use during his crusade in Egypt, and their design was expressly meant to mirror that of the Red Galley of Provence (a ship whose specifications were recorded by French royal clerics). Evidently, similar Byzantine-style *dromons* were used in the Western Mediterranean until the later 14th century. These biremes employed two oarsmen per bench, each pulling a single oar, and two benches to the bank (upper and lower). By that stage another influence was having an effect on galley design. A fresco in the Palazzo Publico in Sienna which depicts a naval battle between Frederick I 'Barbarossa' (1152–90) and the Venetians (painted by Spinello Aretino c.1400) suggests a new development. In the fresco, galley oars are no longer arranged in two tiers (the bireme system, as used by the Byzantines), but are grouped in pairs, on a single tier, supported by an outrigger. Straps held these oars in place. Other slightly later paintings show oars grouped in threes.

This development can be explained by documentary sources. By the 14th century, the Italian maritime states had begun to regulate shipbuilding, and issued *decretti* (decrees), specifying how a galley should be built. Even the building of galleys designed for merchant service was regulated, as these were impressed into naval service by the state when required. By 1300, the Italian regulations specified that the oarsmen would sit in one tier, on benches which were set at a diagonal angle to the hull (usually sloping aft from the hull to the galley's centreline). Two, or later three or more, oarsmen sat on the bench, each pulling on his own oar. These were, by necessity, grouped together in twos or threes, with the tholes (or oarports) through which they passed set together. This system, known as *terzarulo* provided the name for galleys fitted out in this manner.

In order to cope with the oarsmen having oars of different lengths (which they needed in order to contact the water in a line), the oars were balanced on an outrigger. This device, known as an *apostis*, was a solution that had been used in antiquity, and was revived in the late 14th century. It served as a framework to support the oars, but also provided some kind

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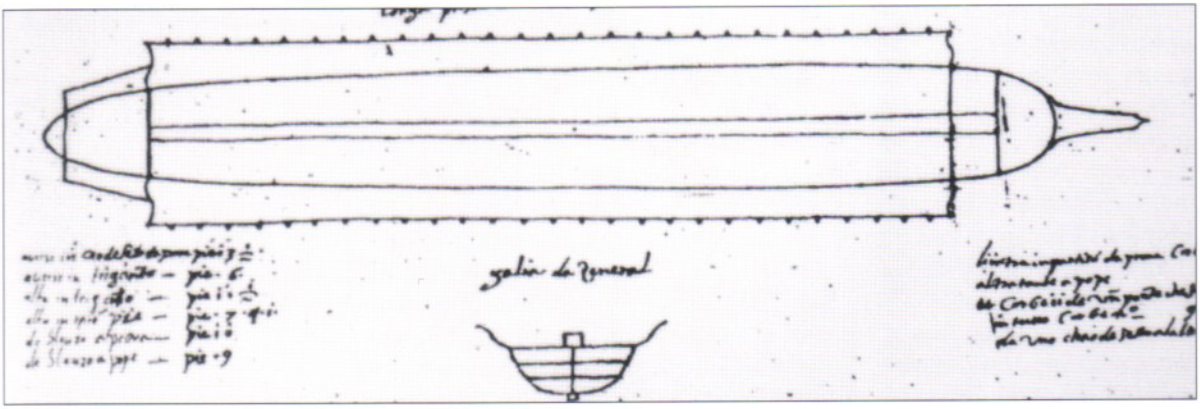
of defence from ramming, and could be used as a fighting platform for soldiers if it was decked over (as happened from the 15th century onwards). Above all, it increased the leverage enjoyed by the oarsmen, as the pivotal point was extended away from the rowers. Clearly the *apostis* increased the beam of the galley, as well as its weight. At first it appears that one of the three oars in a bank was deployed below the *apostis*, but all of the oars were supported by an enlarged *apostis* by the end of the 15th century. The first of these medieval Italian galleys had their oars grouped in twos, meaning two oarsmen sat on each bench. By the 14th century additional power was provided by the addition of an extra rower to each bench, charged with taking over from one of his companions in rotation. Inevitably, this led to the introduction of a third oar per bench, creating the grouping of oars in threes. The *terzarulo* (trireme) system came to be referred to as *alla sensile* (the simple method), and this triple grouping continued to be used until the 16th century.

The shipbuilding *decretti* also indicate differences between the galley designs of different Italian maritime states. In the 14th century, Genoese galleys were smaller than their Venetian counterparts, but grew to match their rivals in size, while having a wider beam. Apart from that, the basic galley designs produced by all the maritime powers in the Mediterranean seem to have been remarkably similar, with the exception of oddities such as the *galia grosse* ('great galley', or more commonly 'merchant galley'). While the majority of merchant ships in the Mediterranean relied exclusively on sail for propulsion, a number of *galia grosse* served as fast transports for pilgrims travelling to the Holy Land, or for the movement of perishable cargoes such as spices. These massively built galleys became the forerunners of the over-sized war galleys and galleasses of the later 16th century. The *galia grosse* formed the backbone of the galley fleets of the 15th century, and was the first type which was adapted to carry large pieces of ordnance. Although slower than conventional galleys, these large vessels could carry more soldiers, and were harder to attack and board during a battle.

By the early 15th century, regular galleys employed between 16 and 20 banks (groups of three) oars per side, but this gradually increased, until by the early 16th century, 25 (later 24) banks became a standard grouping. As the distance between the banks or benches (known as the *interscalmium*) was limited by practicality to just over 1.2 metres (3.75 feet), these typical galleys increased in size as the number of banks



A deck plan and a cross-section of a Venetian galley (*galia da zeneral*), from a late 15th or early 16th century manuscript. It emphasises the graceful lines and high length-to-beam ratio of these medium-sized galleys. (Biblioteca Nazionale Marciana)

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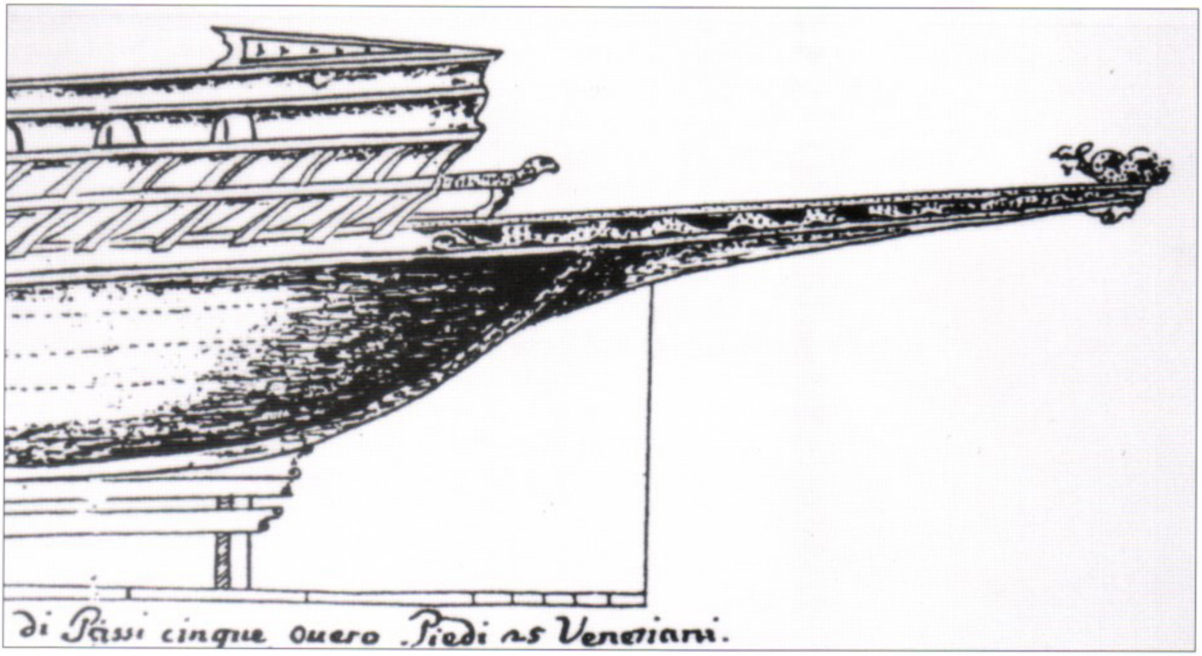

The prow (or *spiron* of a galley (or *galia sottil*), from an Italian manuscript dated to the early 16th century. This interpretation of the original manuscript illustration by André Zysberg shows the seemingly fragile nature of the structure. (Salamander)

increased. A Venetian *galia sottil* (ordinary galley) built at the start of the 15th century averaged 38 metres (127 feet) long, and just over five metres (17 feet) wide, with a draft of 1.2 metres (4 feet), and a displacement of 140 tons. A century later, a typical Venetian *galia sottil* retained the same beam, but typically her hull was lengthened to 41 metres (137 feet), and her displacement had increased to just over 200 tons. This weight increase was largely due to the deployment of heavy ordnance in the bow, and the addition of a corresponding counterweight in ballast near the stern. Some of the larger galleys, used as flagships, had as many as 84 oars per side, pulled by three men per bench. This demonstrates a new trend in galley propulsion, which came to the fore during the 16th century. As well as the lengthening and weight increase of galleys, the same period witnessed other changes brought about by the introduction of gunpowder weapons to naval warfare, which will be discussed later.

Before the introduction of gunpowder weapons, missile fire was provided by mechanical engines (when they were carried), and by crossbowmen. To give the men something to fight from, some war galleys built a fighting platform on the bow, located between the spur and the front rowing benches. When artillery was introduced it was a simple matter to convert this platform into a housing of ordnance. The spur itself was not designed to ram an enemy vessel, unlike the rams of ancient galleys. Instead, it served as a boarding bridge, after it was rammed into the *apostis* then the *telaro* (hull side) of an enemy galley. The ram itself, at the tip of the *spiron* (beak, or prow), was metal-tipped. By the mid-15th century, shipwrights and naval contractors had begun to use drawings to clarify their ship specifications, providing us with a clear indication of exactly how these vessels were built, and how they were equipped. For example, the notes and sketches of the Venetian shipwright Giorgio Trombetta produced during the 1440s can be compared with even more detailed renditions by 16th century shipbuilders, such as Pre Theodoro.

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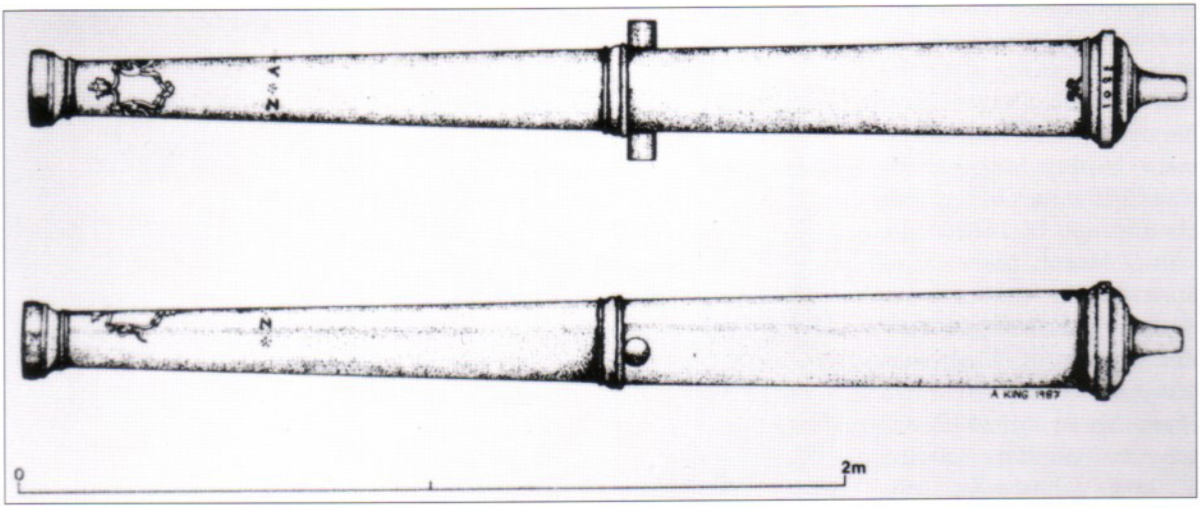
Later still, the Venetian master shipwright Steffano de Zuanne produced highly detailed plans of war galleys near the end of their era.

The biggest change in galley design during the early 16th century, apart from the widespread adoption of heavy ordnance, was the change in the way the vessels were rowed. The *alla sensile* system where a single oarsman pulled each oar was finally abandoned, not because it was inefficient, but because it was prohibitively expensive in terms of labour costs. The typical *galia sottil* of this period had around 24 banks of oars (or three-oar groups), with a bench missing on the starboard side to house the ship's launch, and another on the port side to accommodate the cooking range, or galley. Experiments with the introduction of larger numbers of oarsmen using this system were failures, and by the 1550s the labour costs made it imperative that a way was found to use less skilled labour to provide propulsion for war galleys. Individual oars were replaced by the use of a single heavy oar per bench, rather than three. All the men on the bench pulled it, with a graduated oar-handling attachment that resembled a miniature ladder being developed to compensate for the difference in oar height. This similarity provided the term *alla scaloccio* (ladder style) to the method. It was far less efficient than the traditional method, but it allowed slaves, prisoners of war and criminals to be used as oarsmen. It was found that in order to match the speed of an equivalent *galia sottil* crewed under the old *alla sensile* system, four men rather than three were needed to man each oar, which led to an inevitable increase in displacement, and in the need for provisions, which consequently reduced range. Additionally, as the men were not free sailors, they needed to be shackled and guarded by soldiers, which also added to the displacement. One skilled oarsman called the time on each oar, and the remaining three men simply copied his movements. Clearly there was a relationship between propulsive power, crewing levels (and provisions) and displacement that meant that it was easy to upset the delicate balance between the factors, or to begin an unfavourable competition between increasing power and additional weight. The Venetian Republic retained the older system throughout the 16th century, at least on the *galia sottil*, with the exception of the largest *lanterna* (flagship galley). Similarly the Ottoman Turks also retained the older system, at least until the Battle of Lepanto in 1571.



A bronze muzzle-loading minion, cast by the Italian gun founder Zuane Alberghetti. The Alberghetti family were the most famous (and prolific) producers of ordnance in Renaissance Italy, and several family members held the office of Public Gun Founder (*Publice Fusor*) in the Republic of Venice. (Drawing by A. King, reproduced from the *International Journal of Nautical Archaeology* 17.1 –1988)

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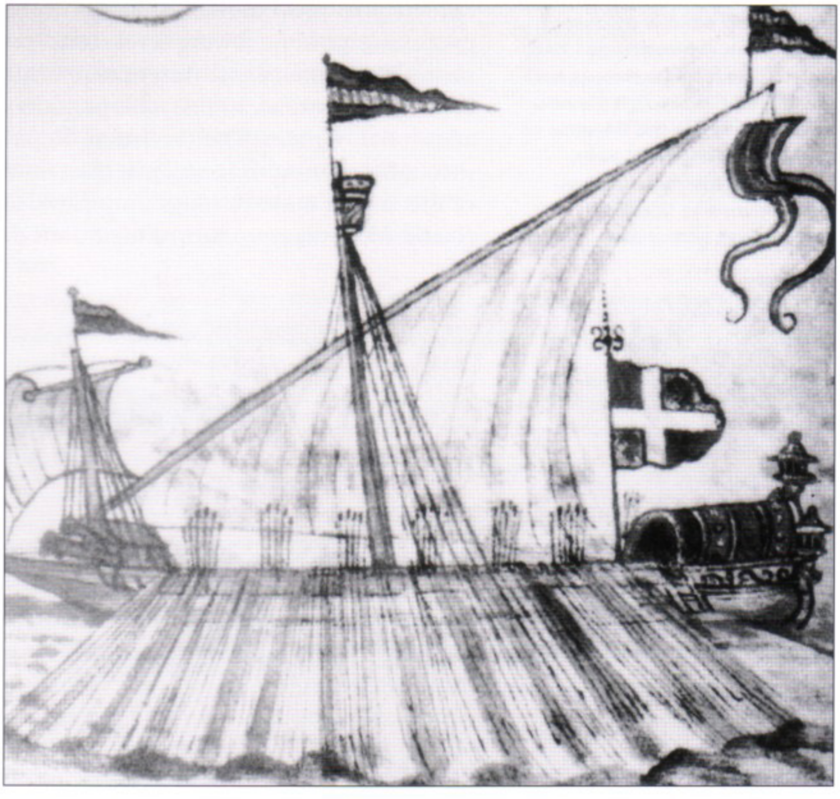
As for the introduction of heavy guns on board war galleys, this development involved little in the way of structural change to the vessels themselves. It was natural to place the largest gun on the centreline of the galley, and by about 1500 it is clear that these were usually bronze muzzle-loading pieces, mounted on carriages that in turn were fitted to a track which helped to absorb the recoil. The fighting platform at the bow of a galley was simply adapted to hold ordnance, and in some cases, an additional fighting platform was added above it to house troops. Unlike sailing ships, which needed to have their hulls pierced to create gunports, the modification of galleys to carry heavy artillery was relatively simple.

ORDNANCE

The exact date when the first heavy guns were placed on a war galley is unknown, but the first known pictorial representation comes in an engraving by Erhardus Reeuwich, as part of a book by Breydenbach, dated 1486. In the engraving of a contemporary Venetian harbour scene, a *galia sottil* is shown with a single bombard mounted far forward in its bow, just behind the *spiron*. In general terms a bombard was a large muzzle-loading gun, like the extant Mons Meg in Edinburgh Castle, with a bore which often exceeded 30 cm (12 inches). It is unclear whether such pieces were usually constructed from wrought iron or cast in bronze, but whatever the construction, they were set in immobile frameworks of timber, designed to absorb the recoil. Five years before Breydenbach's picture a description of the *real* (royal galley) of King Ferdinando II of Aragon (1479–1516) recorded that it carried two *bombardas* (bombards). Certainly lighter swivel guns were almost certainly mounted on galleys before this date, but as yet no conclusive dating evidence has come to light. Despite this, we can assume with some safety that the first swivel pieces and handguns were introduced onto Mediterranean warships by the start of the 15th century, and by 1480 at the latest, larger pieces had appeared.



A Genoese *capitana*, or flagship galley, from a French manuscript illustration dating from the early 16th century. She carries three guns in her bow, one large and two smaller pieces. It is unusual in that the vessel is fitted with a small foremast. (Bibliothèque National, Paris)

Some 25 years after the description of King Ferdinando's first real, a replacement in 1505 was recorded to have carried a large *bombarda,* two

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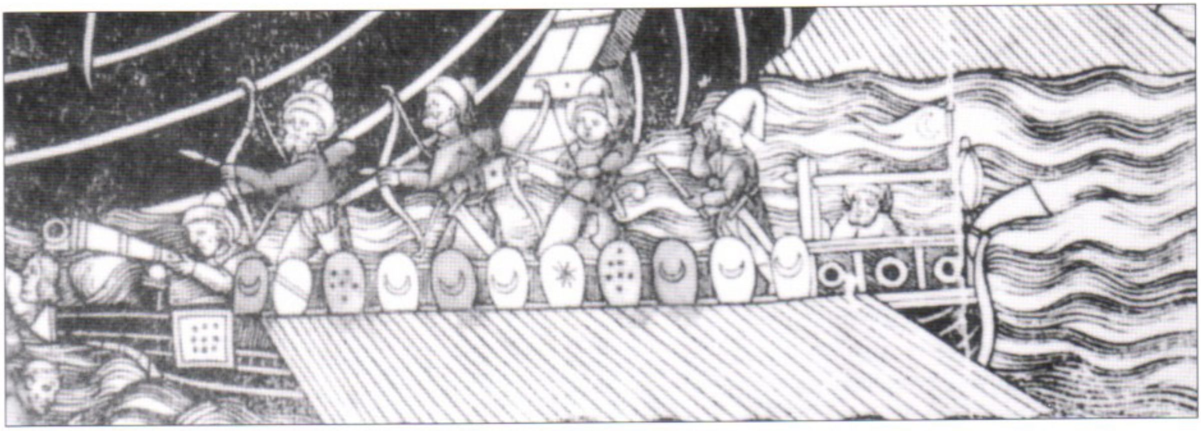

Detail from a Venetian woodcut depicting the Battle of Zonchio (1499). It shows a small Turkish galley mounting what looks like a swivel gun, supported by archers using composite bows. Note the array of shields along the side of the hull, protecting the rowers. This practice ended in the early 16th century.

cerbatanes and a *pasavolante.* All these guns fired stone shot, rather than iron, and presumably all were muzzle-loading guns. Stone shot was one of the earliest forms of artillery projectile, predating the invention of gunpowder. It continued in use until the early 16th century, as for all tactical purposes it was just as effective as a cast-iron shot, but it required less powder to fire it, and allowed the guns it carried to be lighter. Although they fell from use due to the spiralling cost of stonemasons' wages in the 16th century, the Ottoman Turks retained stone-firing ordnance until the end of the century.

These bombards were large, heavy guns, whatever they fired, or whatever metal they were constructed from. It was therefore logical to mount them on the centreline of the galley, in a fixed mount, only capable of firing directly forwards. Creating traversing carriages was considered too complex, and it was considered easier to aim the gun by pointing the galley rather than the gun itself. By 1500 pictorial evidence shows that these pieces were mounted on specially constructed gun platforms, which also served as a gathering point for boarding parties, waiting to storm over the *spiron.* Secondary deck-mounted heavy guns, emplaced on the flanks of the main gun soon augmented these principal guns. At first two of these flanking guns were carried, then by the 1540s four guns became commonplace, two on each side of the main gun. Between the main guns, a small battery of swivel guns tended to be mounted to support them, placed on a row of heavy posts lining the forward edge of the gun platform. While this level of ordnance can be seen as typical in general terms of the Christian maritime powers in the Mediterranean, specific nations, squadrons or galleys could vary considerably from the norm.

As for the Ottoman Turks, who had become a leading power in the Mediterranean after their capture of Constantinople in 1453, they lagged behind Christendom in introducing ordnance onto their warships. In a Venetian woodcut depicting the Battle of Zonchio (1499) between the Venetians and the Turks, while the Venetian warships (mainly sailing vessels) are shown armed with a variety of guns, the Turkish galleys appear to carry swivel guns, not large pieces of ordnance. Even on Christian galleys, heavy batteries of ordnance were a rarity until 1530, apart from on the larger, more prestigious vessels. As a rule *reales* and *capitanas* (squadron flagships) tended to be better armed than the average galleys in a fleet.

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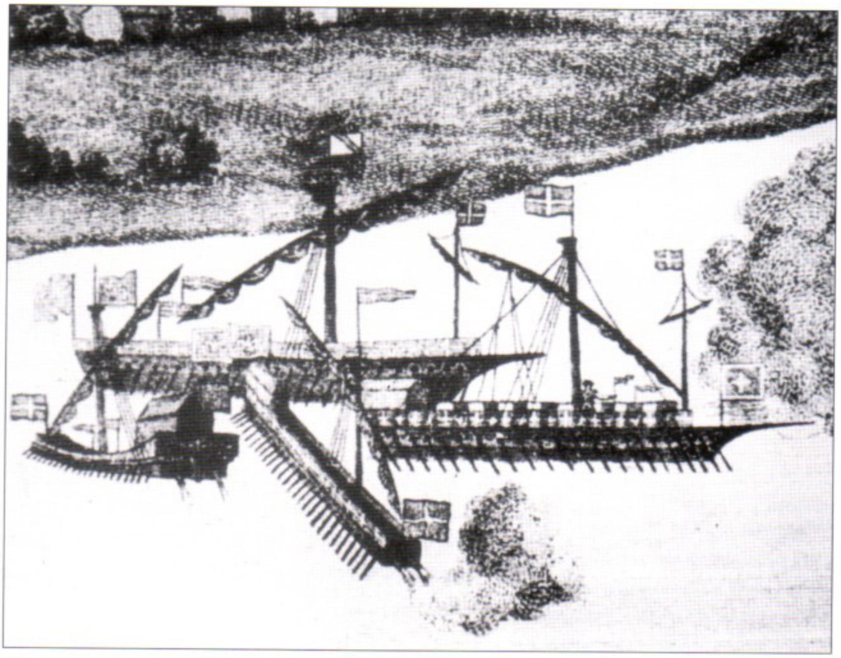

French war galleys in action. Detail from an engraving depicting the Battle of Portsmouth (1546). It appears that the galleys are firing, then disengaging to reload, in a tactic similar to the *carracole*, a contemporary cavalry evolution. (Society of Antiquaries, London)

By the third decade of the 16th century the production of bronze ordnance had increased considerably, a development which was reflected in the proliferation of bronze guns assigned to fortifications or siege trains on land. In the galley fleet, different maritime powers assigned varying levels of importance to the deployment of heavy batteries of bronze muzzle-loaders. Of all these states, the newly unified Kingdom of Spain produced the most-heavily armed galleys in the Mediterranean from 1500 on, until the end of the 16th century. While inventories reveal that the typical Spanish *galia sottil* often lacked guns of any kind, larger, heavier galleys carried increasingly powerful batteries.

Certainly a variety of swivel guns was carried on all Spanish galleys (the guns went by a variety of names, including *versos, verso-dobles, ribadoquines* and *esmeriles*). Of these, *ribadoquines* fell from use (according to contemporary inventories) by 1530. The remaining three types of swivel gun continued to be used, and were in three graduated sizes, with the *esmerile* being the largest (and seemingly of bronze construction, as opposed to the typically wrought-iron construction of the smaller Spanish swivel guns). From 1550 on, wrought-iron swivel guns appear to have become increasingly rare, and bronze pieces became the norm.

The Venetian Republic maintained the largest Christian galley fleet in the Mediterranean throughout most of the 16th century, and its vessels attained some degree of homogeneous construction and ordnance allocation. This was because Venetian galleys were armed by the state Arsenal, creating a probable degree of standardisation that was unusual in other galley fleets. From the time of the Erhardus Reeuwich engraving (1486), it appears that the Venetians tended to rely on a larger central gun than other maritime states rather than the addition of smaller flanking guns, as typified by the Spanish galley fleet. They certainly deployed flanking guns by 1538, however, as they are mentioned in accounts of the Battle of Prevesa. Also, unlike the Spanish, the Venetians avoided the use of large *lanternas*, and placed a greater emphasis on speed rather than firepower, which increased displacement, and consequently reduced speed through the water.

As late as 1556, we find that Venetian galleys carried only two flanking pieces (as opposed to the four flanking guns deployed on the typical Spanish *galia sottil*, but the weight of ordnance was the same, which meant that the Venetians deployed a larger centreline gun, firing a larger projectile. Even here there was an effective cap of about

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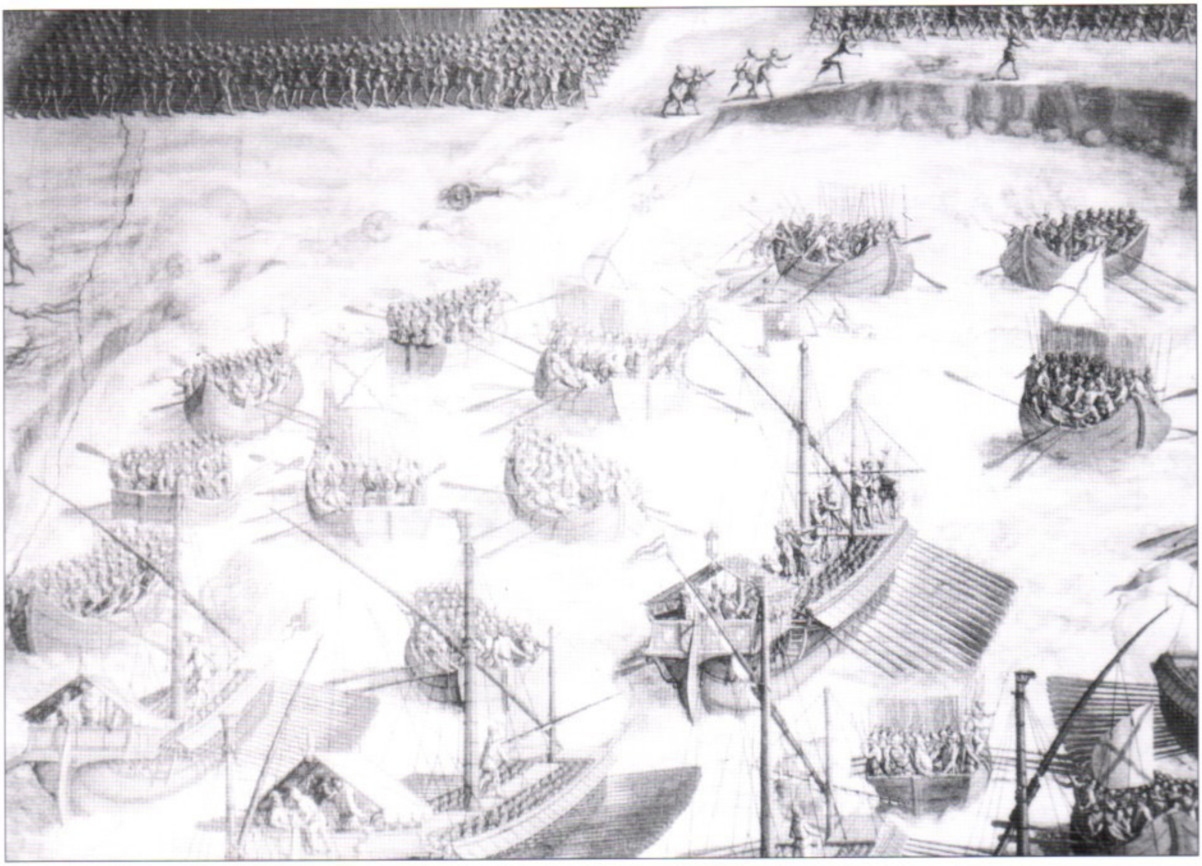
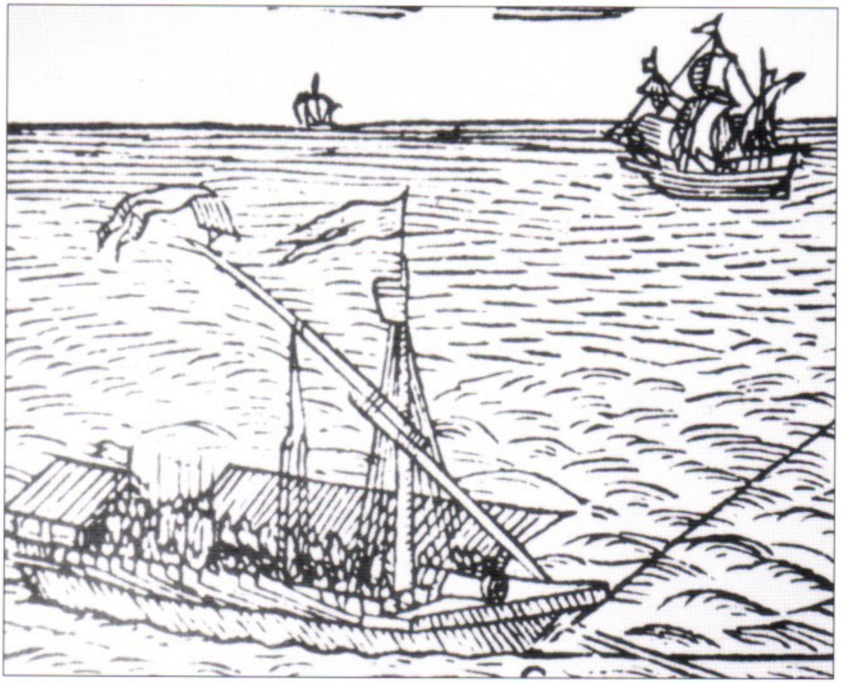
2.7 tonnes (6,000 pounds) on the weight of any such single gun, and even greater restrictions on the weight of flanking pieces. As a rule of thumb, their maximum weight was limited to one third of the weight of the centreline gun, and no more than the same weight again for all the flanking pieces.

As for other maritime powers, little detailed information is available concerning the armament of Ottoman Turkish galleys, but they evidently favoured the Venetian approach of a powerful centreline gun, and a reduced emphasis on flanking pieces. The Genoese, clients of Spain for much of the century, followed the Spanish lead, but were seemingly reluctant to deploy the full weight of ordnance carried by their Spanish counterparts. Genoese commanders hesitated to sacrifice 'dash speed', the ability to surge forward for a brief period to avoid trouble, or to ram another galley. The French and the Knights of St John (based by this time in Malta) followed a different strategic view of galley warfare which emphasised the use of ordnance, as demonstrated in a French galley action off Brest in 1513, and a Maltese one in 1570. In both cases, the galley fleets tried to hold their own by firepower alone. While this was successful on the part of the French, superior numbers of Barbary corsairs occasionally overwhelmed the galleys of the Knights of St John. The Portuguese also relied on firepower, but favoured a lighter ordnance fit, probably as their galleys were required to operate in the rougher waters of the Atlantic. Little is known of the galley fleets of the Papal State and of Mamluk Egypt, though we do know that the galleys operated by

The Spanish landing troops under the covering fire of a galley fleet, in a detail from a mural depicting the Spanish capture of Terciera, in the Azores (1583). The galley was ideally suited to this form of close-range artillery support. Detail of a wall mural. (Palacio de Don Álvaro de Bazáan, Viso del Marques)





A galley armed with a large bombard is used to demonstrate the art of sighting, ranging and guessing distances, from Nicollo Tartaglia's *Three Books of Colloquies* concerning the arte of shooting in great and small pieces of artillery (London, 1588).

the corsairs of the Barbary Coast (North Africa) emphasised speed and close combat over firepower. Whatever the nationality, with the possible exception of the Venetians, there was a great variety in the size and type of ordnance suites deployed on war galleys.

A technical innovation in or around 1530 necessitated a change in the way guns were operated. The changeover from bombards to longer, narrower cast-bronze pieces created problems for designers, as they took up far more space, and were harder to operate due to their length. The problem was solved around 1530 by the introduction of a sliding gun carriage system. Guns were suspended from their trunnions in wooden boxes resembling later naval gun carriages, but without truck-wheels. Instead, they were fitted onto a shallow flat-bottomed trough or rail. Although the guns themselves were restrained by the usual tackle expected on sailing warships to secure and run out large pieces of ordnance, the recoil forced them back along these runners when the guns were fired. On the majority of galleys, the centre-line gun was sited so that the track ran underneath the *corsia*, or central gangway of the galley, the track sloping down slightly towards the stern. This meant that the gun could be secured further aft than its normal firing position when the piece was not being used in action. On some galleys, it appears that this system of runners extended as far aft as the mast.

For flanking pieces the options were more limited. Extreme flanking pieces (i.e. those furthest from the centreline) may have had special runners constructed on the *apostis*, but this was unusual. For the inboard flanking guns and most outboard ones, the track was restricted to the width of the gun platform, although in some cases the guns were designed to slide back beneath the front two rowing benches. Clearly this added a further limitation to the size of flanking pieces, as there was simply not enough space to allow guns larger than 12-pounders to recoil.

Another modification introduced during the 16th century was the *arumbada*, a fighting platform for swivel gunners and infantrymen built on top of the gun platform. This first appeared during the 1530s on Spanish galleys, and by 1550 its use had spread to 'client states' such as Genoa and the Papal State, and less than a decade later it was used by the French galley fleet. Clearly the addition of a fighting platform on top of the gundeck increased the weight of the galley, and further reduced its speed. It was a clear indication that the Spanish viewed their galleys in a different light from the Venetians or Turks, placing a greater emphasis

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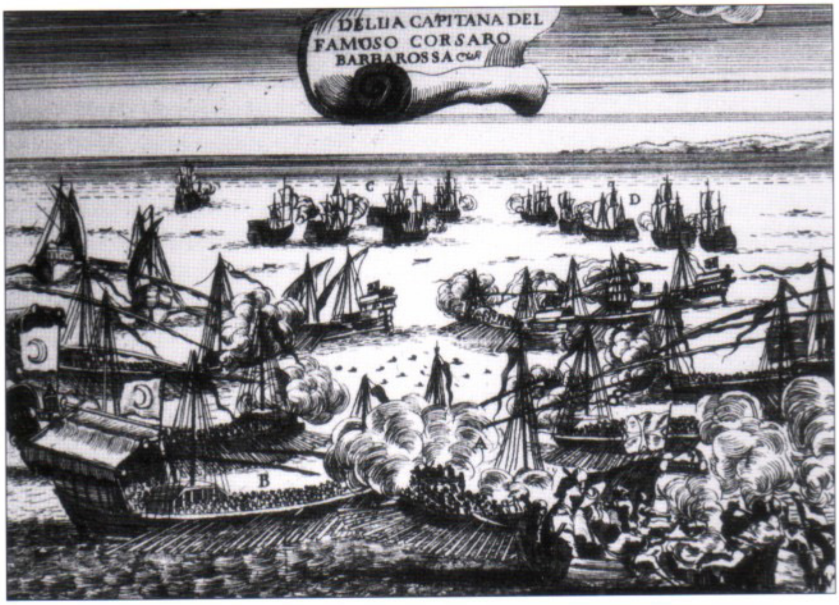
on effectiveness in battle rather than in speed and manoeuvrability. The Venetians and the Turks avoided the use of these weighty structures until the very end of the 16th century.

Another indication of the Spanish preoccupation with tactical power comes from a mid-16th century list of the Spanish and allied galley fleet. In it, apart from the main armament of a centreline gun and two flanking pieces per side, a battery of swivel guns was emplaced on posts between the main guns. Further swivel guns were mounted on the *arumbada*, while others covered the stern ladders. Interestingly, the list also describes the deployment of broadside pieces. Most galleys had a gap in their oar banks on each side, for the ship's boat and the ship's cooking area, both located abaft the mast. On some Spanish galleys, it appears that heavy guns were mounted in their stead, creating some degree of broadside firepower. In addition, small mortars were mounted on the poop deck and probably on the *arumbada*, where they were presumably used as anti-personnel weapons.

The types of guns used, and the way they were used in action, will be discussed later in this study, in the section covering tactics. We still do not know many of the finer points of galley armament as the records no longer exist, but we can at least follow the general development of galley armament during the 16th century, and identify the main differences between tactical doctrines.

GALLEY TYPES

The *galia sottil* (ordinary galley) was far from being the only galley type in existence during the period, although it did make up the vast bulk of the galley fleets of the Mediterranean maritime powers during this period. Flagship galleys, or oared vessels with extra men and ordnance, or specially converted merchant galleys all played an important part in galley warfare. So, too, did the numerous small oared warships, which



The capture of the flagship of Barbarossa, c.1530, in an engraving from Leonard Fronsberger's *Kriegssbuch* (Frankfurt-am-Main, 1573). Khaireddin Barbarossa (1483–1546) was a highly successful ghazi of the Barbary corsairs, who became the Ottoman Turkish High Admiral in 1533.

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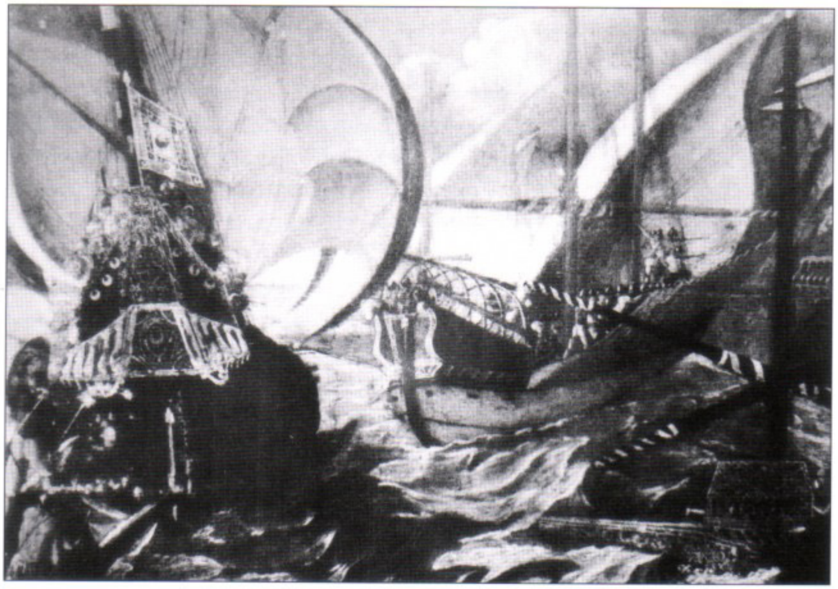

This maritime scene dating from the mid-16th century shows a galley with its oars banked upwards at a sharp angle while it engages a Muslim sailing ship. This highly stylised painting was evidently produced by an artist who was acquainted with the operation of war galleys during this period. Detail from 'Sea Battle', an oil painting of the Italian School, c.1560. (Musée de Besançon)

came into their own as raiding craft and scouts. Before examining galley construction and appearance, it is useful to outline the difference between these mainstays of the fleet and the other types of oared warships in existence during the Renaissance.

Command galleys

In most galley fleets, squadron and fleet commanders often used galleys which were larger than usual, or were provided with an increased suite of ordnance. The flagships of the period were the *lanternas*, named after the trio of large lanterns displayed at their stern, as a means of identification and signalling. These were often the largest vessels in a fleet, symbols of authority with numerous banks of oars, and large contingents of soldiers. For example, the *real* (royal galley) of the Holy Roman Emperor Charles V (1500–58) was a *lanterna* with 28 banks of oars, arrayed *alla scaloccio*, with eight oarsmen per bench. This meant it required a *ciurma* (rowing crew) of 208 oarsmen. The *real* which served as the flagship of Don Juan of Austria at Lepanto was even larger, with 35 banks of oars, but with a *ciurma* of 210 oarsmen, with 6 men to each oar, rowing in the *alla scaloccio* manner. Large galleys also served as the *pretronas* (squadron leader, or *capitana* in Spanish), and often these over-sized galleys were the flagships of smaller national contingents in a larger fleet (e.g. commanding contingents from the Knights of St John, the Papal State, Genoa, etc.). These were usually better armed than ordinary galleys, and these over-sized oared vessels were given the name *bastardas*. Although the term traditionally referred to large galleys with a certain high quota of *ciurma* and soldiers embarked, by the late 16th century the term came to refer to most large, well-armed galleys. These were extremely cumbersome vessels, and their poor performance under oars meant that they were augmented by two or even three masts, all with lateen sails (the exception being the Spanish, who experimented with a mixed lateen and square-rigged sail plan). Clearly, these vessels were unsuited to the *alla sensile* rowing method, although the Venetians and Ottoman Turks

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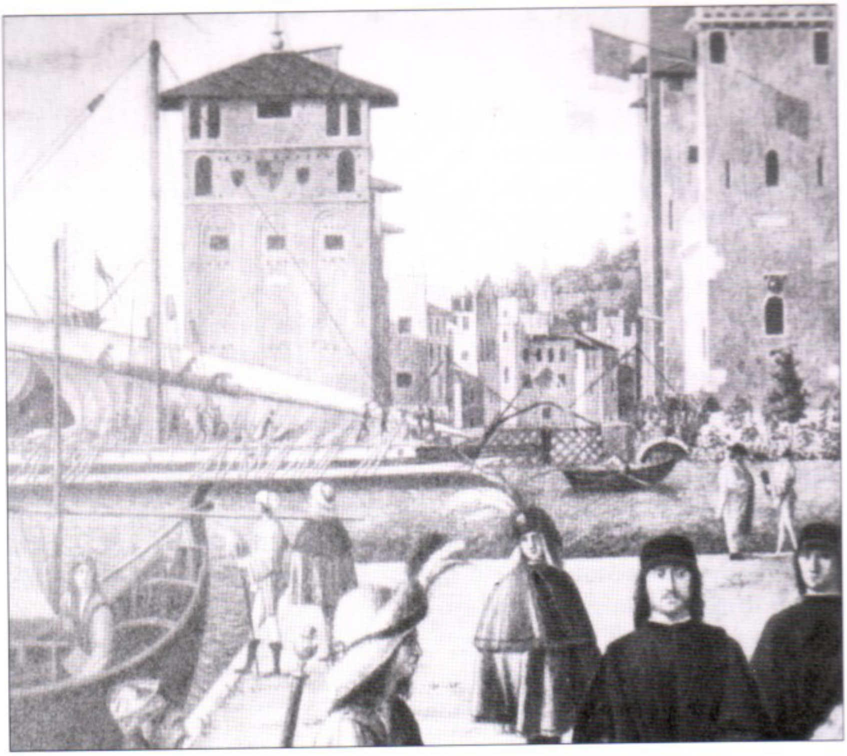

A Venetian merchant galley lying at anchor in Venice, her crew preparing her for a voyage. Detail from an oil painting by Vittore Carpaccio, c.1455–1525. (Gallerie dell' Accademia, Venice)

attempted it with four men to a bench until around 1550 and 1560 respectively, when they switched over to the *alla scaloccio* system for their larger galleys.

The *galia grosse* ('great galley', or 'merchant galley')

In Venice (and to a lesser extent, Genoa), large trading galleys were built from the 14th century onwards and, although designed as non-belligerents, they were often pressed into service as warships during the 15th century. With a length-to-beam ratio of 1:6 (as opposed to the usual 1:8 associated with galleys), they were larger, beamier and had a greater displacement than conventional war galleys. They were designed to carry perishable or high-value cargoes, relying on speed rather than armament to avoid danger. They became particularly associated with the transport of pilgrims to and from the Holy Land. Although the pilgrim trade declined as the fortunes of the Ottoman Turks rose, these merchant galleys remained in use until the middle of the 16th century, and some were refitted to carry artillery, while others were later converted into the first galleasses. In 1501 a *galia grosse* carried a bombard firing a 50-pound ball (see Plate A), and this set the standard for a number of stop-gap conversions during the first decade of the 16th century. The building of specialist large galleys (e.g. *bastardas*) made the *galia grosse* obsolete, and by 1550 none remained in active service. These vessels relied on sails as much as oars for propulsion, and although cumbersome, their high freeboard made them difficult to attack by boarding. Recent historical research (Gardiner and Morrison, *The Age of the Galley*, 1995) suggests that a typical *galia grosse* of the late 15th century measured 180 feet (55 metres) in length, with a 30 foot (nine metre) beam. As they were rowed in the *alla sensile* fashion in groups of three oars, these craft were

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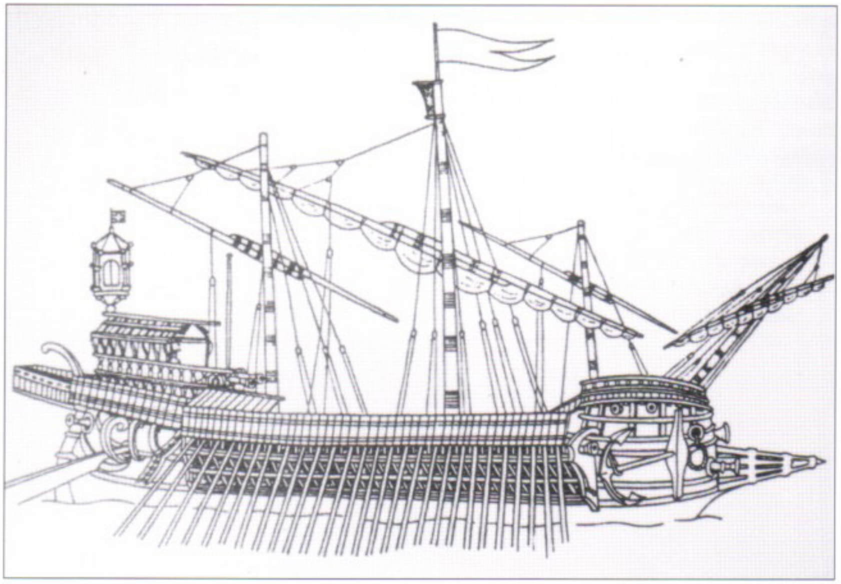
relatively fast given their bulk, but they were also expensive to operate. With an average of 28–30 oar banks per side, these vessels required a *ciurma* of around 180 professional (and well-paid) oarsmen to operate them. Three masts were usually fitted, but following the introduction of heavy ordnance to these vessels, the foremast was removed, making them less effective under sail. Although superseded by the larger galleys of the later 16th century, the *galia grosse* provided a useful stopgap during the fledgling period of the deployment of heavy guns at sea, and the cross-over from one rowing system to another.



A Spanish galleass, based on an interpretation of the painting by Andrea Vicentino depicting the Battle of Lepanto. The original is in the Palazzo Ducale, Venice. Note the fortress-like quality of the circular forecastle, with ordnance of various sizes sited to give a virtually all-round coverage of fire. (Salamander)

Galleass

The galleass (or *galeazza*) has been seen as the ultimate development of the oared fighting ship, a last-ditch attempt to produce a galley which could counter the growing power of the sailing warship. As such it was a reactive design, not a revolutionary one. Although the result was an extremely powerful warship, it was not in itself a decisive naval tool, despite the part played by the Christian galleasses in winning the Battle of Lepanto. It was a Venetian invention, designed to counter the growth of powerful *bastardas* in the Spanish galley fleet. This fear of being overwhelmed by superior firepower led to the conversion of a number of *galia grosse* hulls. A rounded forecastle was fitted in place of the gun platform, and it was pierced to house an impressive array of up to nine heavy guns of various sizes. Additional artillery was placed on broadside mounts above the *arumbada*, and on the stern, where they could fire into the waist to repel boarders, or act as stern chasers as circumstances dictated.

The fact that these galleasses were fitted with three masts has led to the erroneous assumption that these were primarily sailing warships which were capable of moving under oars when required. This was far from the case, as they were designed as fighting vessels, and the sails were simply a means of augmenting the vessel's transit speed. While earlier reconstructions of galleasses suggested that the oars would have had to be raised in order to fire any broadside guns, clear evidence now suggests these pieces had a clear field of fire over the *arumbada*. The first Venetian galleasses appeared during the 1530s, and within a decade the Spanish had copied the design, adapting them to a mixed square and lateen sail plan, which made them more suitable for operations in the Atlantic. A Venetian *decretto* of the 1530s ordained that these vessels should be 47 metres (152 feet) long, with an eight metre (26 foot) beam. They were powered in the *alla scaloccio* fashion, with 25 banks per side,

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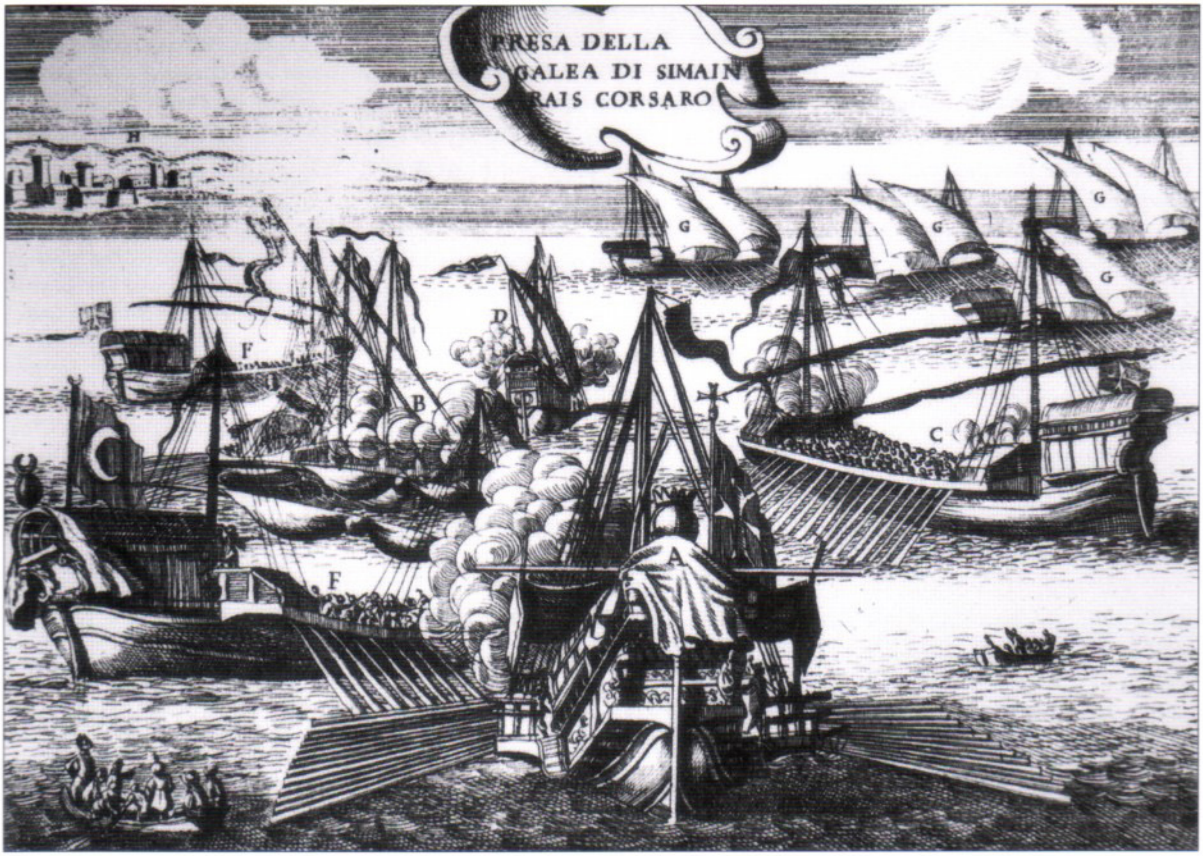
with five oarsmen per oar. In addition they carried 250 soldiers, 70 sailors and of course a chaplain. Such was the prestige afforded to these vessels that they were often associated with the great Venetian oligarchic families, and were unofficially named accordingly (e.g. Malipiero, Contarini, etc.), although their given names were more martial or religious. Seven such galleasses fought at Lepanto, and bore the brunt of the fighting for much of the engagement.

Small oared warships

While war galleys were usually kept in reserve, to participate in major actions, smaller oared warships – *galiots* (also spelled *galliot*), *fustas* and *bergantines* – proved vital to the waging of Mediterranean warfare in the period. They were widely used as raiding craft, but they also acted as scouting vessels, as despatch boats, as fast transports, as patrol craft and, on occasion, they also served a useful purpose in full-scale battles.

The *galiot* was basically a smaller version of the ordinary galley, with between 16 and 20 oars per side (18 banks being the most common size), although even larger *galiots* did exist, and these could have as many banks as an ordinary galley (i.e. 24). The difference between these craft and larger oared warships was that *galiots* were rowed *alla scaloccio*, with two men to each oar. They also had a lower freeboard, which was an advantage during amphibious raids, but made the craft vulnerable during any action against full-sized galleys. With a far smaller displacement than their larger counterparts, *galiots* were fast and highly manoeuvrable,



A battle between the Knights of St John and a handful of galleys from the Barbary Coast. Entitled 'the capture of a corsair', the engraving provides a rare stern view of a Christian galley, showing the ladders and small boats used to reinforce engaged galleys during a battle. Engraving from Leonard Fronsberger's *Kriegssbuch* (Frankfurt-am-Main, 1573).

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In 1570 the island of Cyprus became the focal point of the two-year naval campaign which preceded the Battle of Lepanto. In this map of the island, Christian carracks (sailing ships) and both Christian and Muslim galleys are shown skirmishing with artillery.

meaning that in theory they could outperform larger vessels, and avoid contact at disadvantageous terms. While fast under sail with the wind astern or on the quarter, they were less effective than galleys with the wind on their beam, as their shallow draft provided little resistance to leeward motion. Typically, a *galiot* was around 27 metres long (87 feet) with a beam of three metres (10 feet), and a draft of less than two metres (6.5 feet). It was provided with a single lateen-rigged sail on a single mast. A 20-bank *galiot* would carry 80 oarsmen, supported by up to 60 soldiers, and a handful of gunners. It usually only carried a single centreline gun (a 16–24-pounder piece), supported by a small bank of swivel guns.

The next vessel type down in size was the *fusta*, with only 10–15 banks of oars per side. Like the *galiot*, the *fusta* was rowed *alla scaloccio* with two oarsmen per bank, meaning such a vessel could carry up to 60 oarsmen, supported by 30–40 soldiers. Like the *galiot*, a typical *fusta* only carried a single centreline gun (a 12–18-pounder), and a handful of swivel pieces. The *fusta* was the perfect raiding vessel, and was economical in terms of ordnance, crew and operational costs, but she was usually considered too small to participate in a full-scale galley fight. Like the *galiot*, the *fusta* carried a single mast, fitted with a lateen sail, and was undecked (i.e. she carried no elaborate poop deck structure). Unfortunately no accurate measurements of a *fusta* survive, but we can estimate they were approximately 21.5 metres (70 feet) long.

Smallest of all was the *bergantine*, a slim, fast vessel, with 10–15 oars per side, each pulled by a single oarsman. This gave the larger *bergantines* a crew of up to 30 oarsmen, supported by 20 soldiers. They rarely carried a large piece of ordnance, but were armed with a few swivel guns as a bow battery. Despite their lack of size they were ideal vessels for amphibious landings, and for the transport of soldiers from one ship to another during a battle. In a typical galley action, the *bergantines* would form what amounted to a 'shuttle service', moving reserves of troops to galleys under attack, or to bolster threatened sections of the galley line. A Venetian *bergantine* was reportedly 16 metres (52 feet) long, with a 2 metre (7 foot) beam. It was also known as the *brigantino* (brigantine). A derivative was known as the *saettia* (arrow), and was an even leaner, faster version, used as a dispatch boat.

Other names of small oared vessels also appear in contemporary accounts. The *panfilo* was a medieval Italian derivative of the Byzantine

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merchant *dromon*, but by the 15th century it had developed into a small merchant galley, with its oars in a single tier, each pulled by two oarsmen.

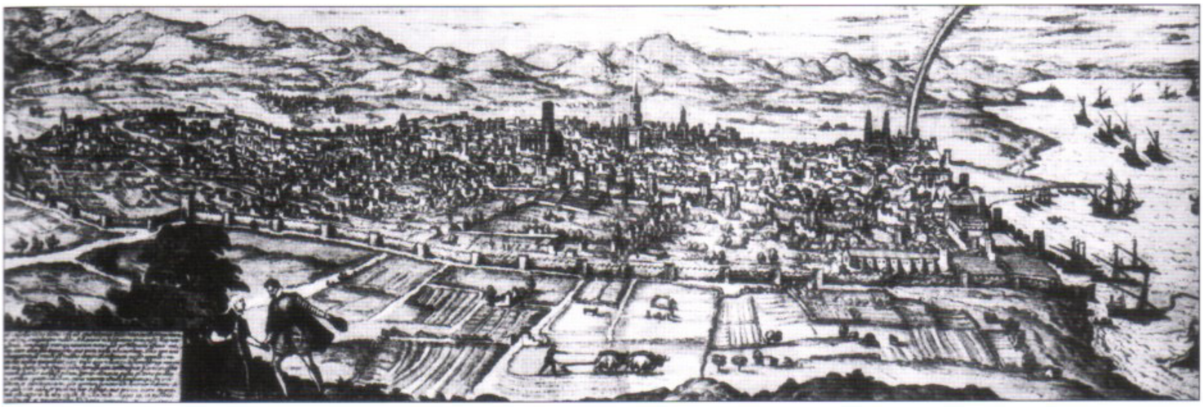
GALLEY CONSTRUCTION

While the other variants of oared warship all played an important part in the Mediterranean during this period, the *galia sottil* formed the backbone of the Renaissance galley fleet. At the Battle of Lepanto, out of some 233 Christian galleys present, only 32 were large galleasses, *lanternas, capitanas* and suchlike, or less than 14%. In the Turkish fleet, the proportions were even lower at 11%, although 64 of the 280 galleys present were actually smaller *galiots.* The *galia sottil* was therefore the real arbiter of victory.

The shipwrights of Venice, Constantinople and Barcelona who built the Mediterranean war galley fleets in the 16th century did so empirically, having no access to mathematical data on the crucial factors of stability, rowing performance, displacement, hydrostatic resistance and so on. Rather they relied on experience, the observation of the performance of existing methods, and on the following of guidelines established by the naval contractors of the relevant maritime powers. Despite that, semi-scientific treatises on shipbuilding were produced by both the Venetians and the Spanish, and while no extant copies of similar Ottoman works have surfaced, we can draw on other sources of evidence in the Turkish naval archives in Istanbul. This said, it was the Italians who made a science out of galley construction during this period, and who left the best-written record. Although the scope of this book precludes a detailed study of galley construction, Gardiner and Morrison, *The Age of the Galley*, 1995, contains several scholarly studies of the subject, and the work contains an extensive bibliography which lists these 16th century sources in detail. In this study of construction, Italian terms have been used, as that was the language used by the writers of the most comprehensive shipbuilding manuals.

These contemporary shipbuilding instructions (*partisoni*) are particularly informative. For instance, we know that by the start of the 15th century, a virtually prefabricated skeleton of light frames was used, held together by a wooden longitudinal framework of strips known as the *maistre.* This gave the hull its shape, and then the edge-joined

The port of Barcelona during the mid-16th century, an engraving by an unknown Spanish artist. The port served as the main base for the Spanish galley fleet during the 16th century, and the crown maintained extensive shipbuilding and repair facilities, as well as an arsenal.



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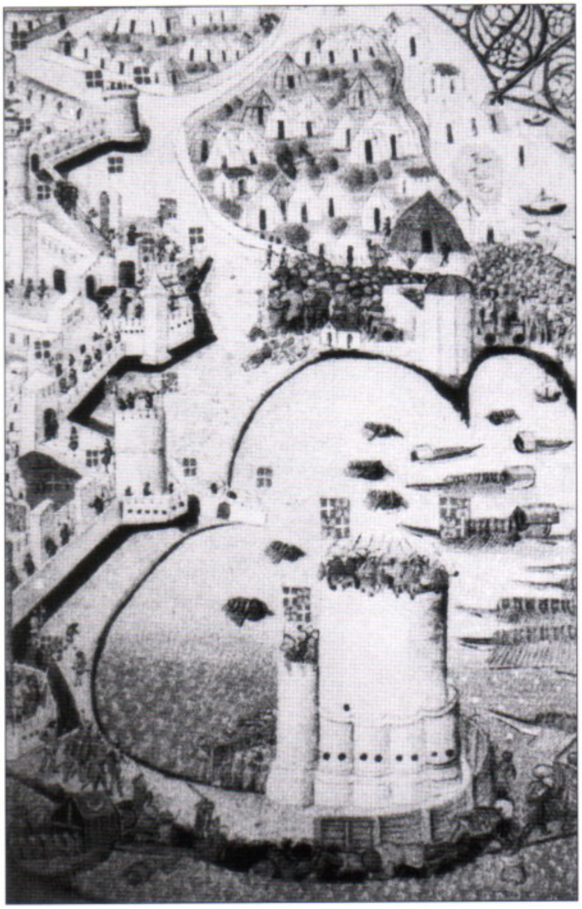
(carvel-built) strakes were attached directly to this supporting structure. Additional frames were then added to impart further strength to the structure. This was a hybrid form of construction, using the old 'shell-first' Mediterranean method, but drawing on the 'frame-first' construction used in medieval Europe to add extra strength to the vessel. The Venice Arsenal had pre-cut frames and planking already in stock. Then shipwrights simply had to piece the vessel together, a little like building a modern wooden sailing boat from a kit. This accounts for the speed with which both the Turks (who practised the same system) and the Venetians could replace galley losses by the following season. The Venetian shipwright Steffano de Zuanne expounded on the superiority of the Venetian system over the less structured building processes of the other maritime powers: '255 uniquely different wooden parts [plus] the bottom and the frame timbers… are required for a galleass… Moreover only two different frames are needed for the 240 wooden parts of a *galiot*. This works so perfectly that all you need to do is to set them at the prescribed position, and they form a perfect hull.'



The Knights of St John repulsed the Turkish attack on Rhodes in 1480 after a long and bitter siege. In this illumination of the siege, Turkish galleys are shown landing troops beneath the city walls, while in the foreground another galley unloads engineers, sappers and equipment. (Bibliothèque National, Paris)

The 'kit' itself was the result of some careful mathematical calculations. The main frame (the widest one, in the centre of the hull) was the first to be laid, followed by the next ones on either side. This set the shape for the whole hull, as outlined in the *partison de fondo* (the first construction stage in the *partisoni* building manual). Next, the sides of the frames were extended, the frames nearer the bow and the stern forming more of an acute angle of slope than the more rounded midships section. Steffano de Zuanne then outlined the third step, where the light framework was constructed, creating the curved lines of the hull. The rest of the construction process was simply a matter of planking and decking, then fitting the mast step, gun platforms and other deck structures, including the rowing frame. Once again, these were prefabricated, and stored in the Venetian Arsenal. This said, the complex constructions at the bow and the stern of these galleys were virtually impossible to fabricate completely, and it still came down to the skill of the individual shipyard, and of its master shipwright.

The Ottoman Turks developed their own prefabricated system, and stocked galley parts in their shipyards at Constantinople and Salonika.

Other Mediterranean maritime powers attempted to follow suit during the 16th century. The Genoese used a similar procedure from the late 15th century onwards, but relied on the *mezza luna* system, where a triangulation technique was used to determine the size of frames, following which a prefabricated production method was applied, but their galleys had slightly different lines from their Venetian counterparts. As a Neapolitan shipwright put it, their 'hull curvature is neither smooth nor pleasing to the eye.' These differences were in part doctrinal ones, as

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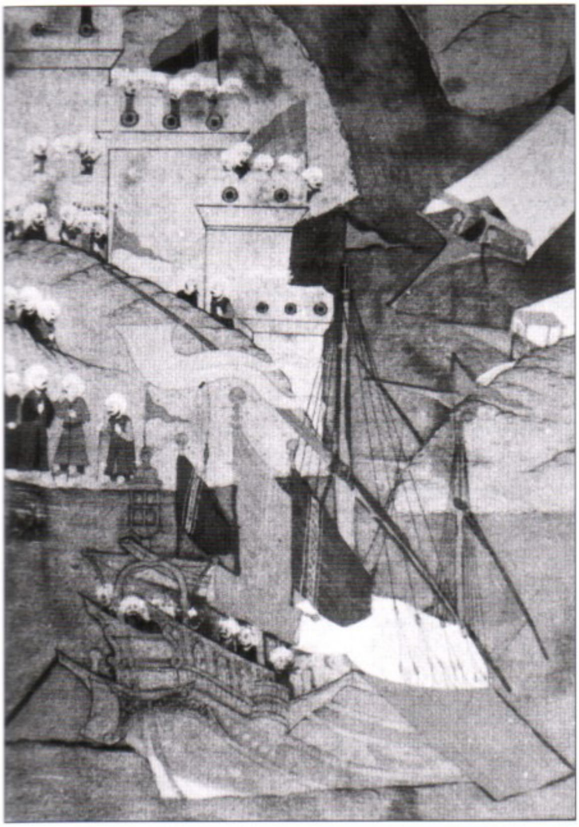
each nation varied the design of its craft to suit its strategic needs. For instance an account of a typical Turkish galley recorded that 'the *corsia* cannon is set aft of the prow, where it can be aimed more easily', and it went on to describe how their vessels had a flatter bottom than Venetian vessels because the Turks wanted to be able to beach their ships with ease. The Venetians preferred a more pronounced angle amidships, as it produced a better sailing performance, and provided a more stable gun platform. The *partison* system was introduced in Spain during the 1540s (the Barcelona shipyard was expanded to house prefabricated frames in 1546), and the French and Portuguese also adopted similar methods of construction. As far as we can tell, galleys were still built following more traditional methods by the Barbary corsairs, the Knights of St John and by the Egyptians.

The effect of this construction system was a standardisation that was virtually unique in an age of limited industrial potential. As one Venetian put it: 'All galleys of the same size are so similar in all respects that a man who moves from his own galley to another would hardly notice that he was on a different vessel.' It added that: 'Venetian vessels were as similar to each other as one swallow's nest to the next.'

Turning to the appearance of the galley itself, we have the *partison* plans for several galleys, of a variety of nationalities. Unfortunately information on Turkish galleys is sparse, but documents in the collection of the Turkish Naval Museum indicate that their vessels were remarkably similar in size, shape and outward appearance to Venetian galleys. A model of one such galley c.1570 indicates that the vessel was similar to the specifications quoted in Rodgers' *Naval Warfare Under Oars*. From a compilation of contemporary sources, he defined a *galia sottil* as being approximately 51 metres (165 feet) overall, with a beam of 5.5 metres (18 feet) and a draft of 1.5 metres (5 feet). It was fitted with 25 banks of oars, served by 150 rowers (three per oar). Venetian galleys were arrayed *alla sensile*, with oars in groups of three, each pulled by one oarsman, while all other maritime powers relied on the *alla scaloccio* system, where three oarsman operated each oar. This included the Turks, who only transferred from the older system to the new one around 1550. Turning to pictorial evidence for galley appearance, there was little difference between those of the Turks or the Christians, although contemporary sources describe the sleekness of Venetian galleys, and the robust construction of Turkish ones. Despite this, both maritime powers had a reputation for building fast galleys, probably because neither overloaded their vessels in the Spanish manner.

Turkish troops embarking on a galley, from a Turkish illustration dating from the late 16th century. The galley was frequently used as a troop transport, as its speed and shallow draft enabled it to land troops virtually anywhere. Amphibious raids by small parties of Turkish regular troops such as these were commonplace during this period. (Topkapi Museum, Istanbul)



The powerhouse of the galley was its *banchi* (rowing benches), but in action these were a liability, as the oars, and the *apostis* which supported them was extremely vulnerable. The *apostis* itself was supported by two yokes, large timbers at either end of the line of rowing

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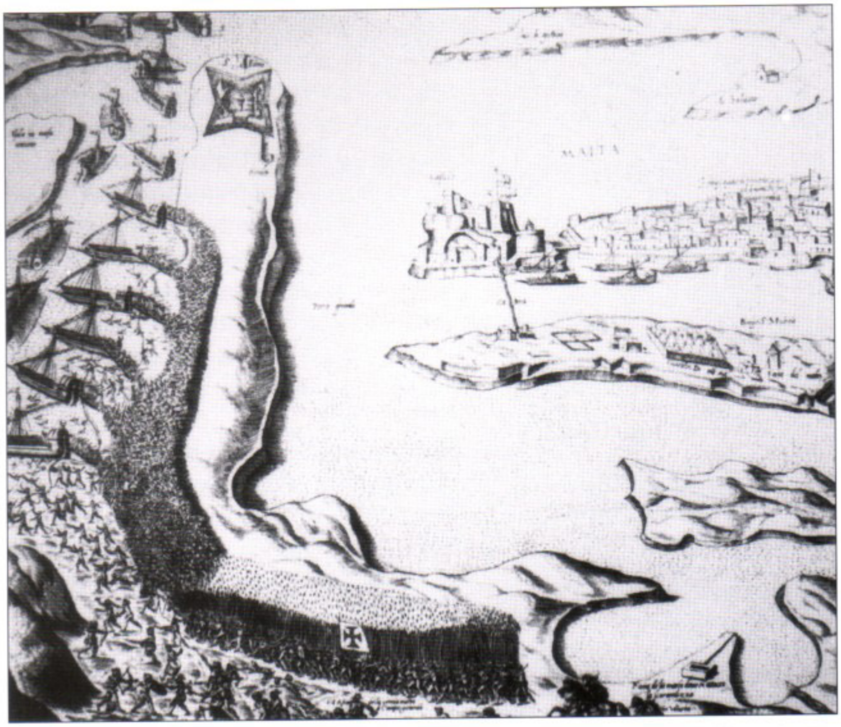

The garrison of the Knights of St John is shown counter-attacking the Turkish army as it disembarks from a squadron of galleys. Note how the Turks are shown disembarking using the stern ladders of the galleys, stepping directly into the surf.

benches. The *apostis*, which was essentially an outrigger, was supported from these horizontal posts. Together, the whole ensemble was referred to as the *telaro*. This structure offered some degree of protection for the rowers against missile fire, and provided a walkway for the sailors and soldiers to perform their duties. Between the rowing benches the long central *corsia* (gangway) linked the poop deck and the gun platform, providing a secure platform for arquebusiers and bowmen. It also contained accommodation ladders which provided access to the area below decks, containing the magazine, storerooms and with space immediately underneath it for stowing the sails when not in use. It also served as an additional means for stiffening the hull. A rudder assembly provided steerage, with an upwardly sloping tiller. The helmsman stood in the covered dais on the poop deck, immediately behind the command position adopted by the galley commander and his senior officers. The mast itself carried a single lateen sail, but from the early 15th century on, larger galleys were increasingly fitted with an extra mast, either mounted as a foremast or as a mizzen. On rare occasions, *lanternas* or other large galleys were fitted with three masts; a main mast, foremast and mizzen mast. The simple rig permitted the sails and often the lateen yard to be stowed before the ship sailed into action.

Finally, all galleys were richly ornamented with paint and gilded wood sculptures. In Italy and Spain sterns were decorated with religious scenes, often painted by some of the most prominent artists of their day. The whole stern structure was the most highly decorated portion of the ship, but elsewhere paint and awnings meant that the typical galley presented a festive appearance. This was accentuated by the prolific use of banners and silk hangings (usually used to drape the poop deck housing). The basic wood of the hull would be painted along the *apostis* and around the stern, with reds, ochres, black and white appearing to be the predominant colours. National flags, religious banners and possibly the personal crests of the senior commanders completed the array of colour in a 16th century galley fleet. Graceful, somewhat gaudy and menacing, these weapons of maritime warfare were probably the most complex war machines of their age, at least in the Mediterranean, and as such, the expense of decorating them was one of the highest costs involved in fitting out a war galley.

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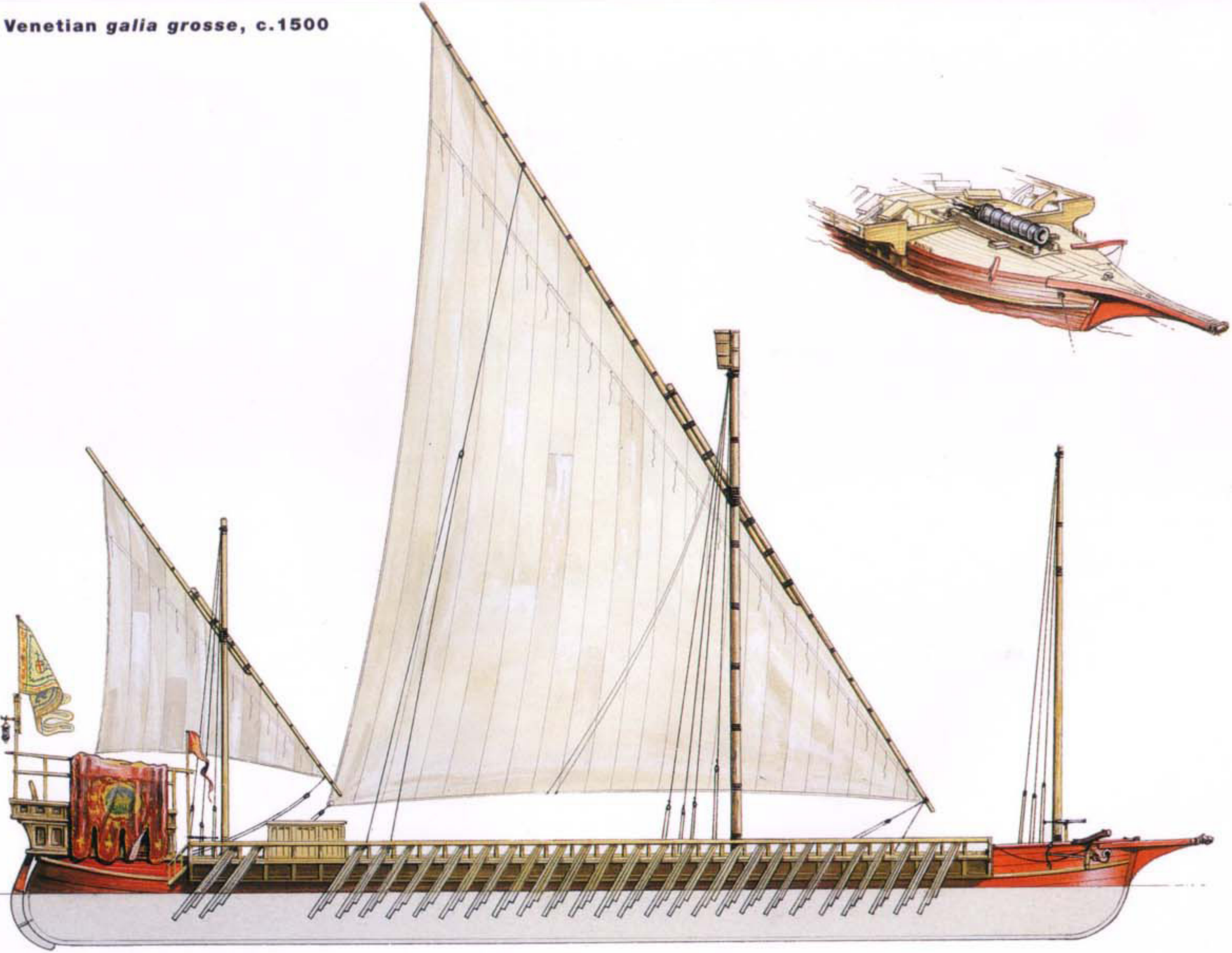
A: A Venetian *galia grosse*, c.1500



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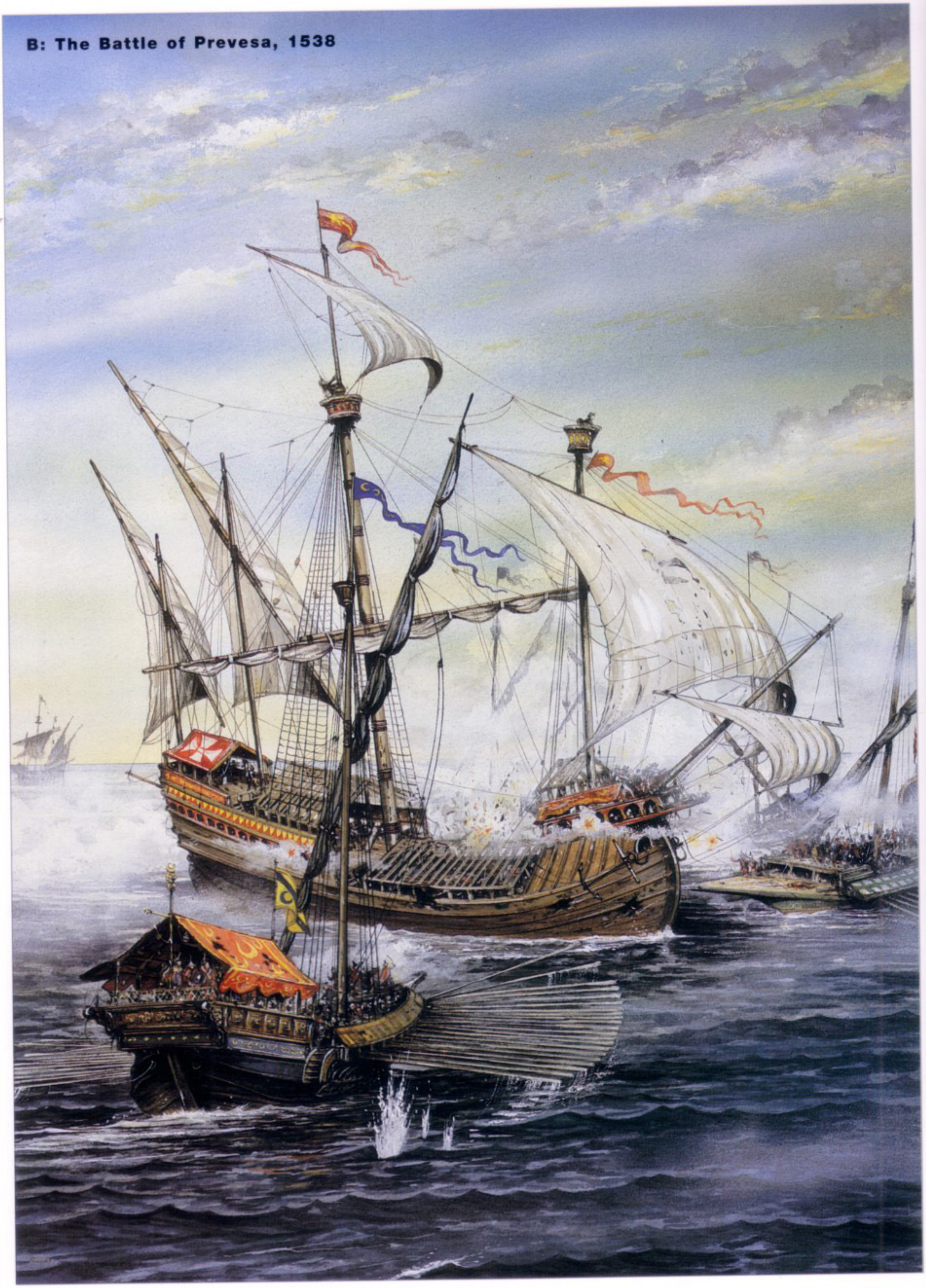

B: The Battle of Prevesa, 1538

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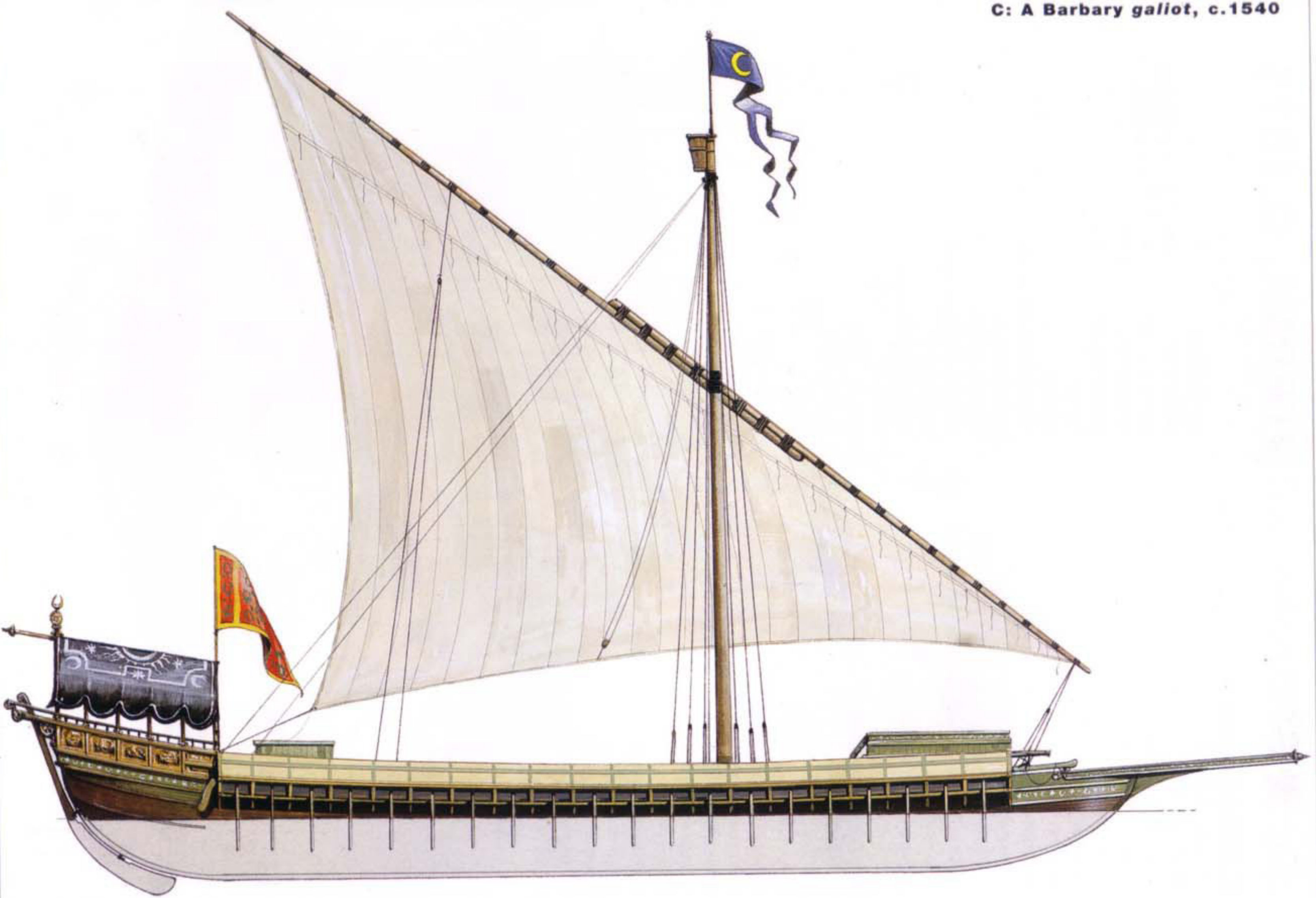
C: A Barbary *galiot*, c.1540



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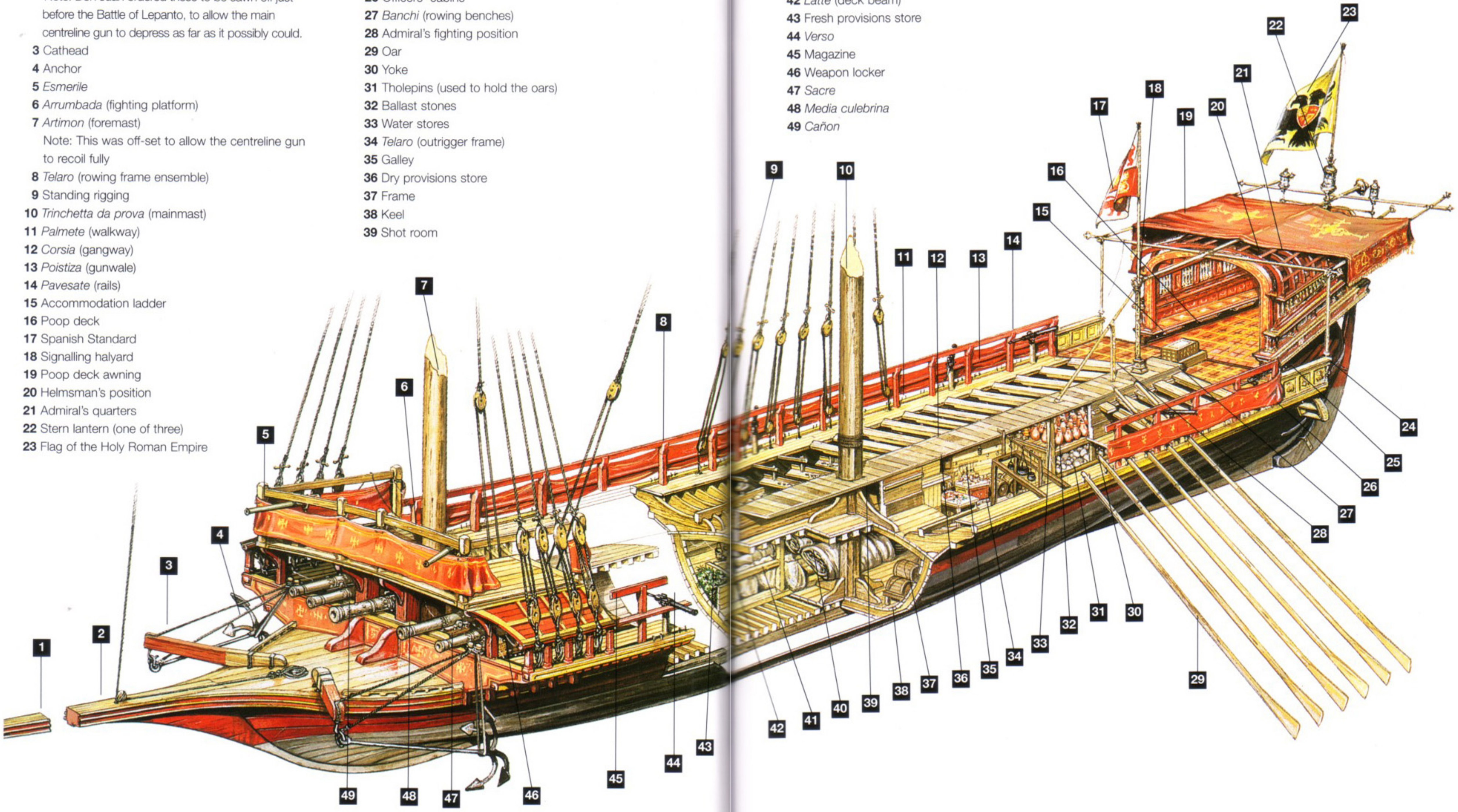
D: A SPANISH *LANTERNA*, C.1571

KEY

1 Rostrum (ram tip)
2 *Spiron* (spur)
Note: Don Juan ordered these to be sawn off just before the Battle of Lepanto, to allow the main centreline gun to depress as far as it possibly could.
3 Cathead
4 Anchor
5 *Esmerile*
6 *Arrumbada* (fighting platform)
7 *Artimon* (foremast)
Note: This was off-set to allow the centreline gun to recoil fully
8 *Telaro* (rowing frame ensemble)
9 Standing rigging
10 *Trinchetta da prova* (mainmast)
11 *Palmete* (walkway)
12 *Corsia* (gangway)
13 *Poistiza* (gunwale)
14 *Pavesate* (rails)
15 Accommodation ladder
16 Poop deck
17 Spanish Standard
18 Signalling halyard
19 Poop deck awning
20 Helmsman's position
21 Admiral's quarters
22 Stern lantern (one of three)
23 Flag of the Holy Roman Empire
24 *Timonera* (rudder)
25 Entry port (one on each side of poop deck)
26 Officers' cabins
27 *Banchi* (rowing benches)
28 Admiral's fighting position
29 Oar
30 Yoke
31 Tholepins (used to hold the oars)
32 Ballast stones
33 Water stores
34 *Telaro* (outrigger frame)
35 Galley
36 Dry provisions store
37 Frame
38 Keel
39 Shot room
40 Shipwright's store
41 Biscuit room
42 *Latte* (deck beam)
43 Fresh provisions store
44 *Verso*
45 Magazine
46 Weapon locker
47 *Sacre*
48 *Media culebrina*
49 *Cañon*



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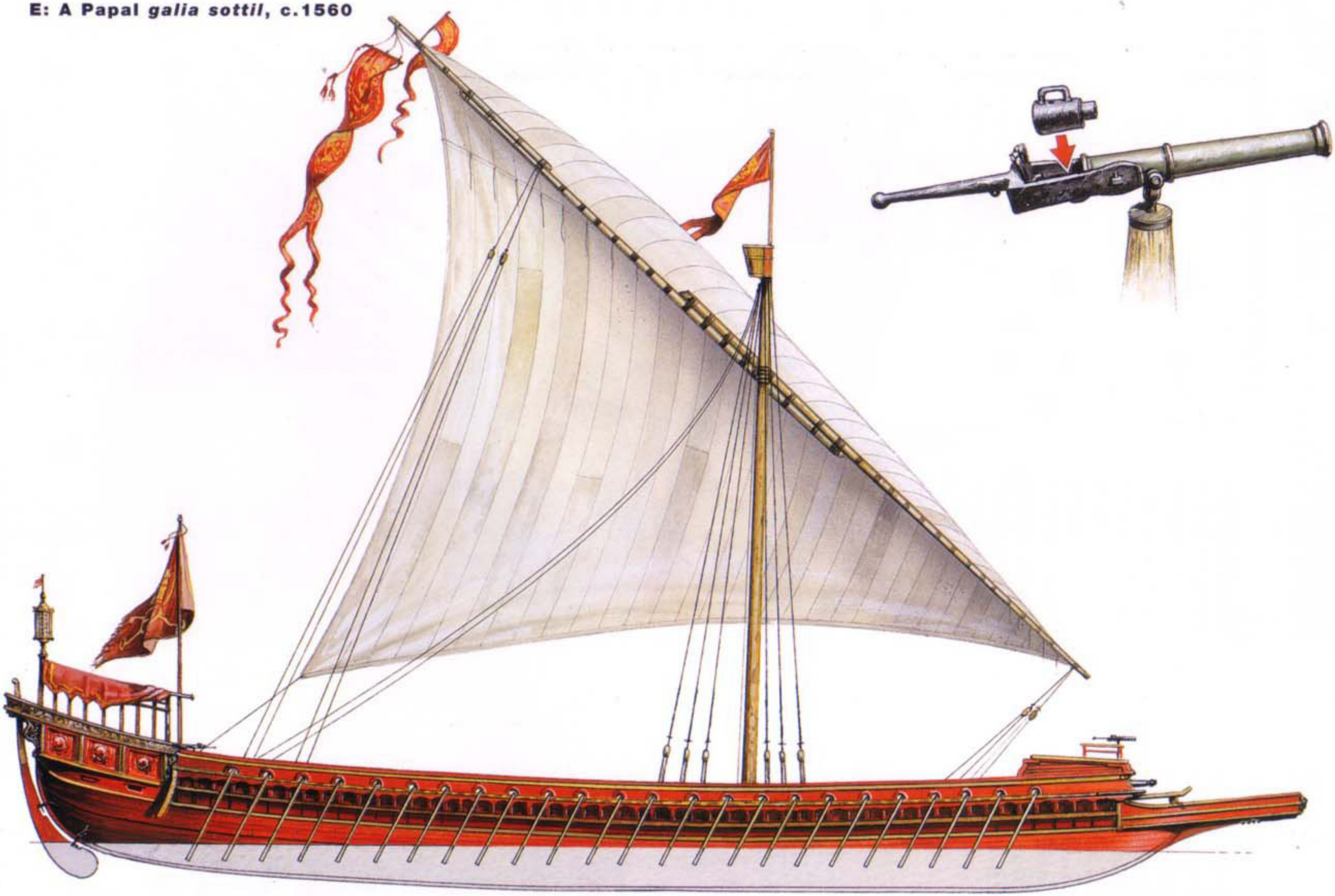
E: A Papal *galia sottil*, c.1560



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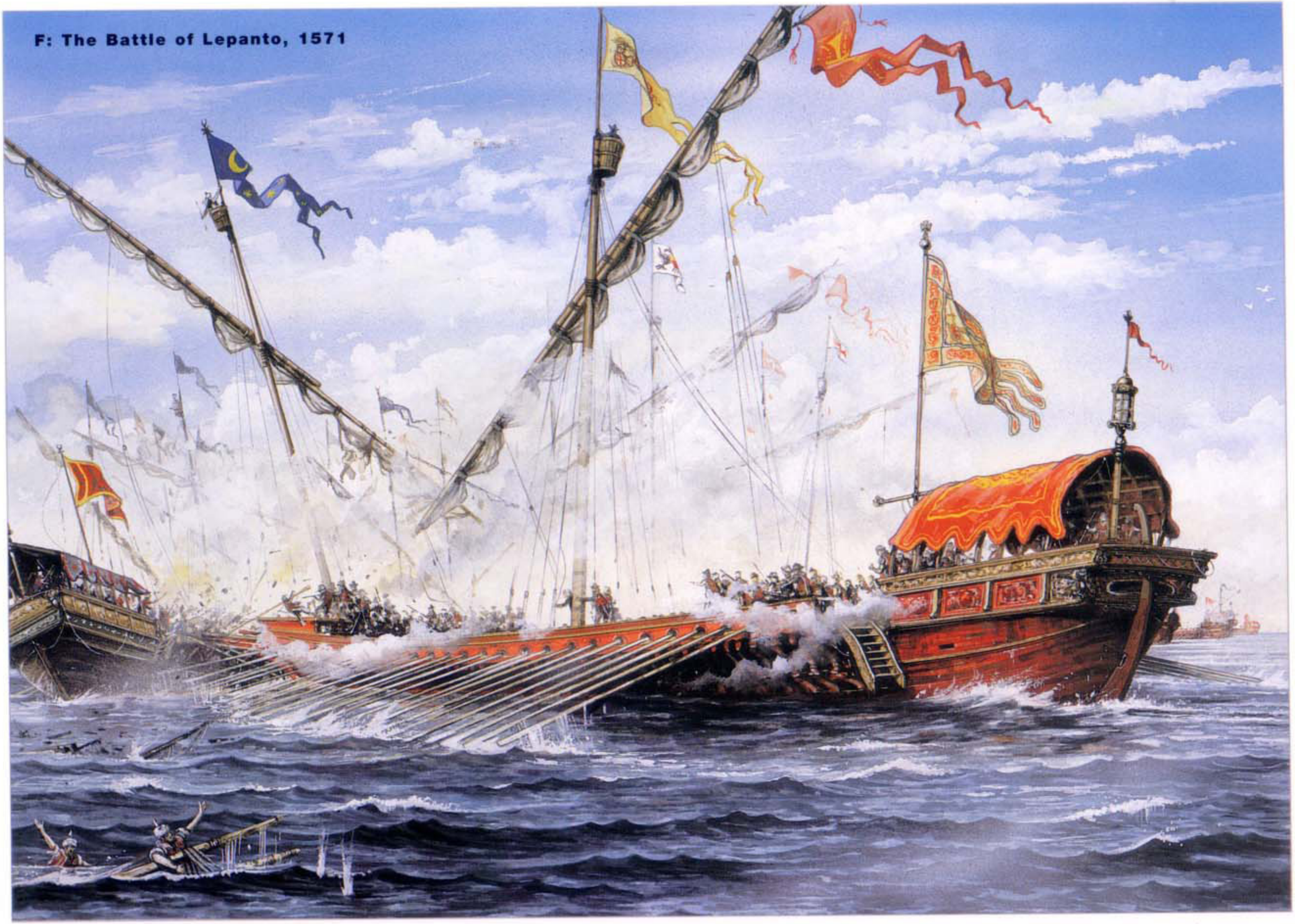

F: The Battle of Lepanto, 1571

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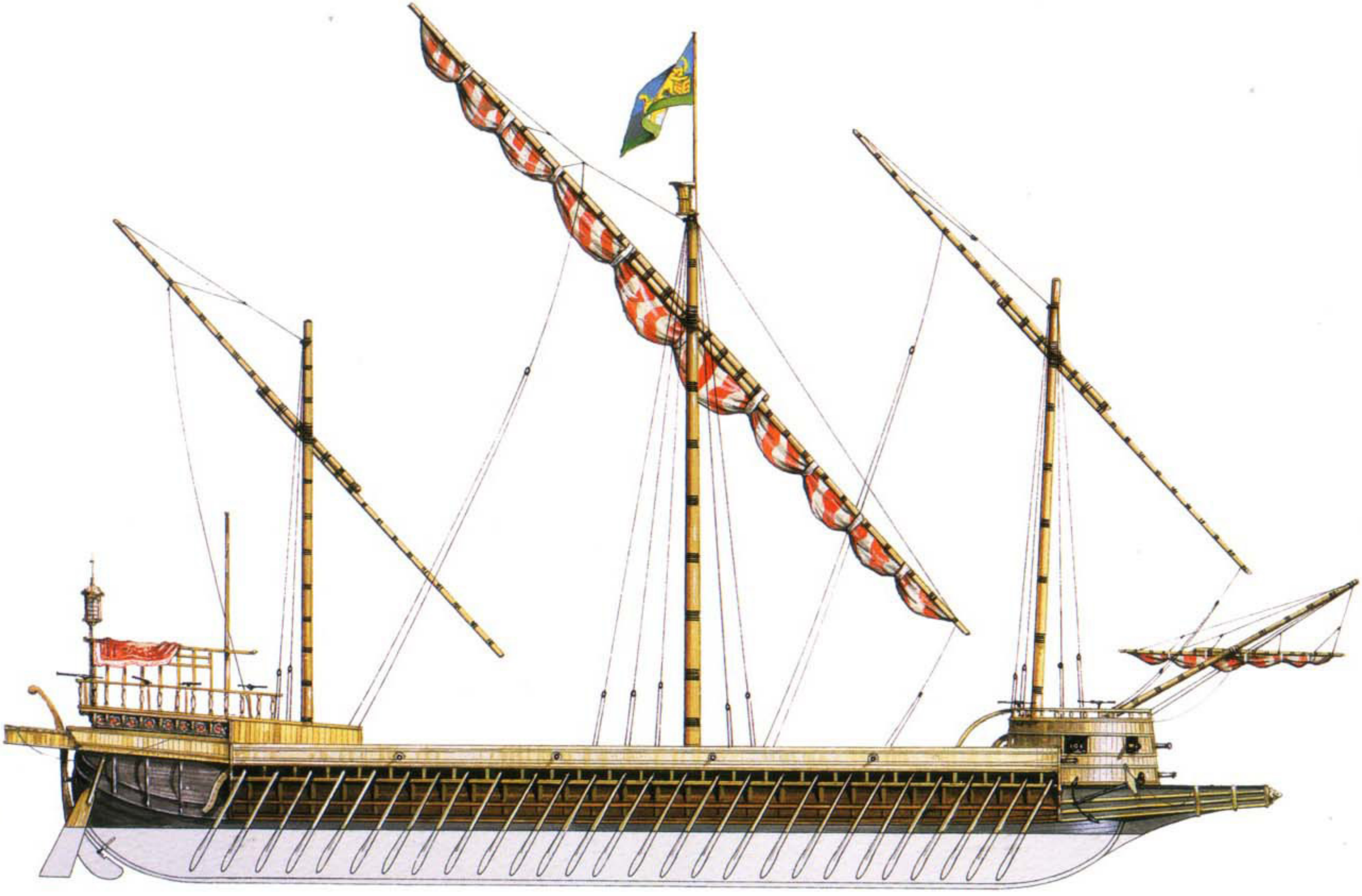
G: A Venetian galleass, c.1571



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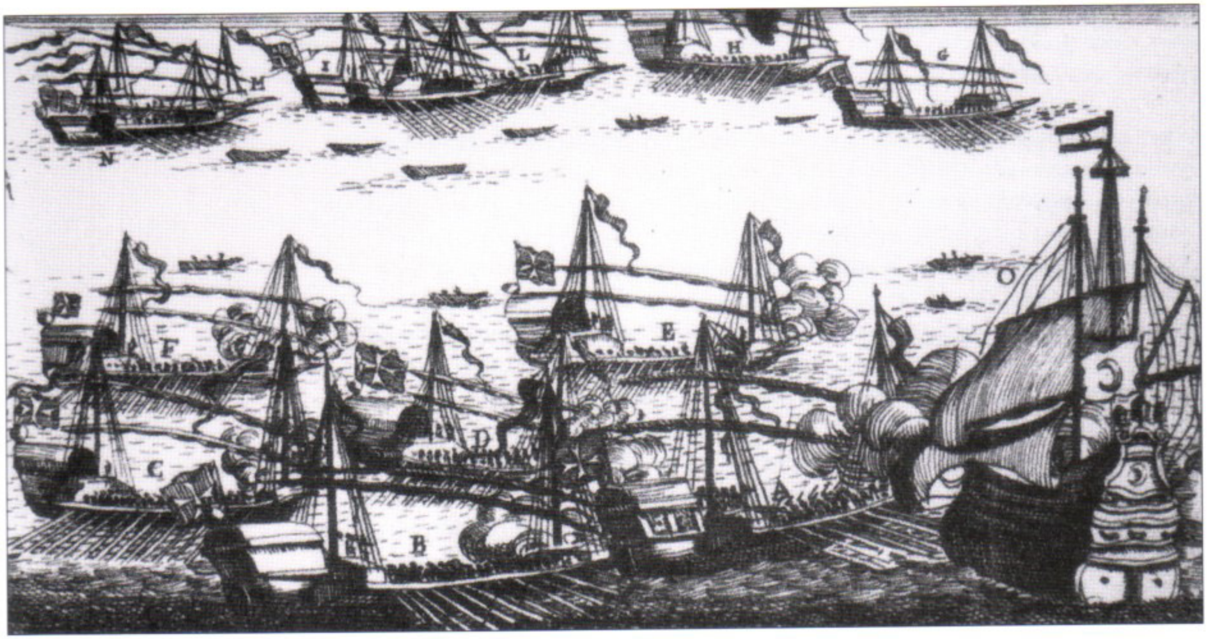
LOGISTICS AND ORGANISATION

Galley warfare was a product of its time and place, and consequently it formed an integral component of the balance of power in the Mediterranean during the 16th century. No maritime power was able to wage war effectively without a powerful galley fleet, but the fleets themselves were limited by pedestrian constraints, such as range of operations, weather and money. First of all, galleys needed a home port, where they could be built, repaired and equipped. Maritime states such as Venice, the Ottoman Empire and Spain maintained extensive shipyard facilities, and ports such as Venice, Barcelona, Cartagena, Marseilles, Genoa, Constantinople, Valetta and Salonika were capable of building and repairing entire fleets of galleys if required.

Galleys were expensive to operate in terms of manpower (as they required oarsmen), money (as, if free men, the crews needed paying), and in provisions (as the crew, free or not, needed to be kept in reasonable health). Galleys were able to carry water and food for a voyage of no more than about four days. Also, they were vulnerable to the vagaries of weather, and like most Mediterranean vessels of the Renaissance, they tended to avoid voyaging at night. This meant they hugged the shore and, given their short range of operations, they needed a friendly port or base within four days' journey, or else they would have to return to their home port after only two days at sea.

The relationship between the galley and the fortified port was therefore a close one, and maritime powers ensured that they maintained a string of secure bases, allowing them to extend the effective range of their fleets accordingly. For the Spanish, this meant bases on the Spanish coast, the Balearic islands, Sicily, Naples and Genoa. For the Venetians, their needs were served by a string of fortified harbours on the Adriatic coast of Dalmatia (Zara, Ragusa, Corfu, then Modon and Coron on the Greek Peloponnese coast – also known as the



A battle between a Muslim merchant sailing ship (the caption refers to it as a 'pirate') and a squadron of galleys belonging to the Knights of St John. The appellation suggests that the merchantman came from the Barbary Coast. Engraving from Leonard Fronsberger's *Kriegssbuch* (Frankfurt-am-Main, 1573).

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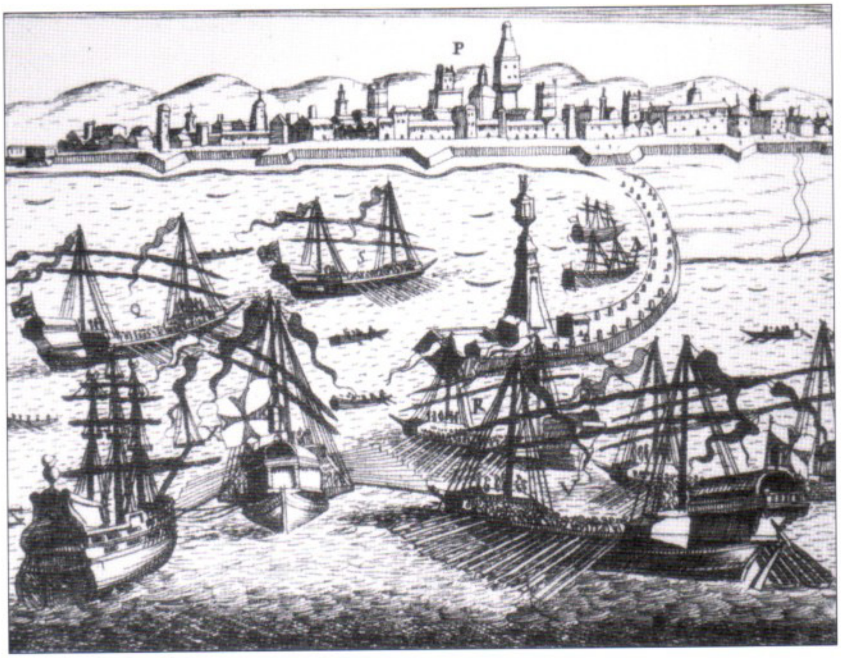

Towing a prize into Barcelona harbour. This is a companion picture to the engraving depicting the capture of a Muslim sailing ship. Note that the Christian galleys carry pennons at their masthead, and also at the upper end of their lateen yards. Engraving from Leonard Fronsberger's *Kriegssbuch* (Frankfurt-am-Main, 1573).

Morea). The loss of these Greek bases to the Turks in 1500 gave the Ottomans the opportunity to venture into the Aegean Sea, and served to limit Venetian ventures into the Eastern Mediterranean. This was a case of strategy being dictated by logistics, in this case feeding and watering the crew.

Manpower was crucial to the maintenance of a galley fleet, and maritime powers such as Venice placed great emphasis on the maintenance of a pool of trained seamen. A conscription system was used by the Venetians to provide oarsmen in time of war; free men called upon to do their civic duty. By the start of the 16th century the lack of trained seamen and the spiralling cost of paying their wages caused many states to abandon systems such as this, and to use slaves to crew their galley fleets. This in itself caused problems, in addition to the requirement to change the rowing system, as discussed earlier. In combat, freemen could be given weapons, and would contribute to a vessel's fighting power. The same could not be expected of the *forzati* (galley slaves), who remained chained to their benches throughout a fight. Venice managed to increase the efficiency of its conscription system, and to hire non-Venetians in sufficient numbers to maintain its *alla sensile* rowing system in almost all of its galley fleet until the 1580s. An experimental squadron of two Venetian galleys crewed by *forzati* was formed in 1545, and four years later the programme was extended to cover several galleys of the local defence squadron. Unlike other maritime powers who used Turkish prisoners-of-war, when pressed to use *forzati*, the Venetians preferred to rely on their own prisons, and Venetian citizens were able to work off debts or shorten their sentences in return for galley service. This meant that these men were treated in a similar way to the regular free oarsmen of the fleet. The Venetians adopted the use of *forzati* with reluctance, and their maintenance of a crew of largely free oarsmen rowing *alla sensile* ensured that they maintained an edge in manoeuvrability, and in close combat.

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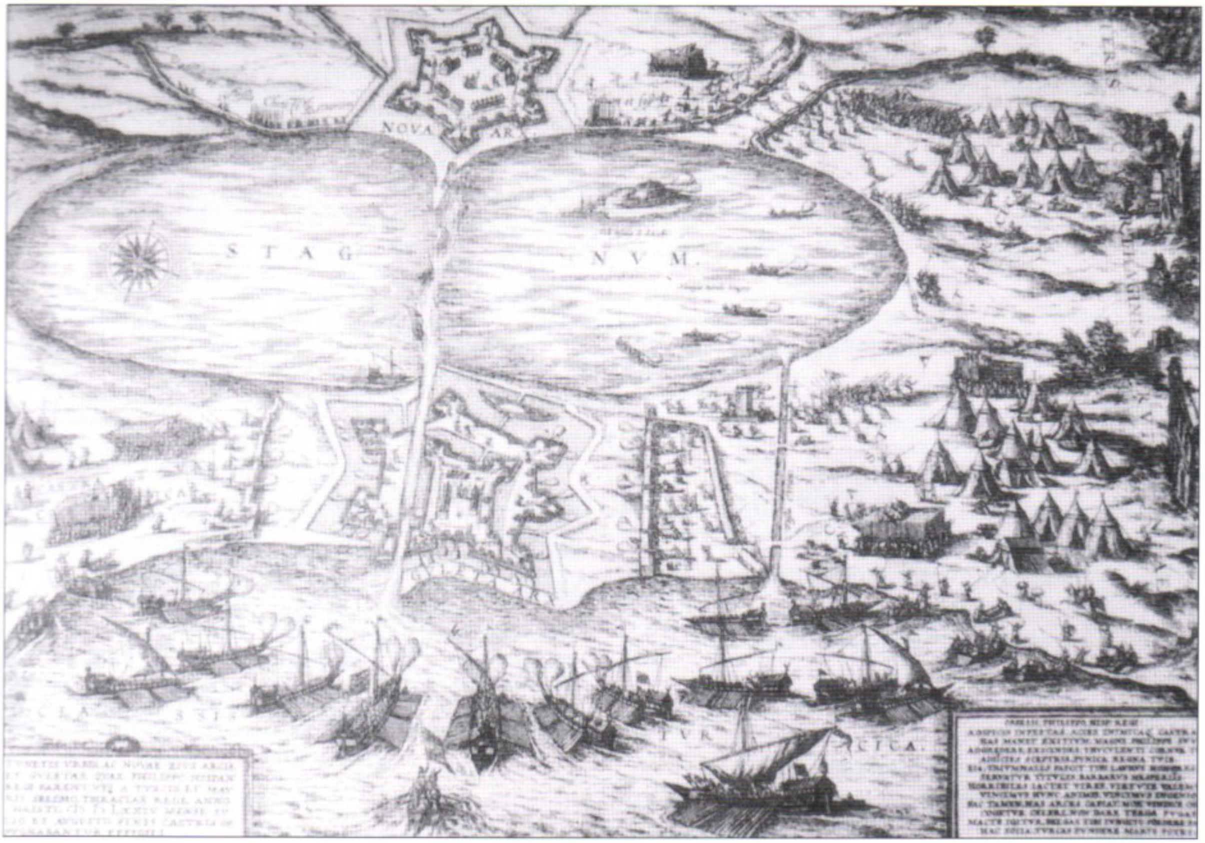

The Barbary Coast port of Tunis was captured by the Christians in 1573, and was duly besieged and recaptured by a Turkish army, supported by a galley fleet, in the following year. Galleys are shown supporting the siege of the first of two outer fortifications defending the city.

As late as the battle of Lepanto only 12 Venetian galleys were crewed by *forzati*. The real Venetian deficiency was in *scapoli* (soldiers). Having traditionally recruited in Dalmatia, Crete, Cyprus and the Aegean, the Turkish expansion following the fall of Constantinople in 1453 denied these fertile recruiting grounds to the Republic. Mercenary Dalmatians were still available, but there were rarely enough of them, a problem which partly explains the Venetian obsession with speed under oars and firepower, allowing her galleys to avoid close combat at disadvantageous terms.

Other nations adopted different approaches to galley slaves. For the privateering operations run by the 'sea *ghazis*' of the Barbary coast, raids on the Christian coast of the Mediterranean produced slaves, who were duly chained to the oars. Their use appears to have been restricted to the larger Barbary craft, as lighter vessels such as *bergantines* and *fustas* were crewed almost exclusively by Muslims. Presumably this was because, as these were raiding vessels, every active warrior would be needed. Their Christian privateering counterparts, the Knights of St John, also relied heavily on *forzati*, captured for the most part from the Barbary Coast. For them, their main emphasis was on their soldiers, their brother knights of the Order of St John. A similar approach was adopted by other Italian galley squadrons such as those of the Papacy, but the Genoese tended to encourage the use of *di buona voglia* (free men of good volition).

Further to the west the French and the Spanish both adopted the use of *forzati* early in the 16th century, and whatever free oarsmen were

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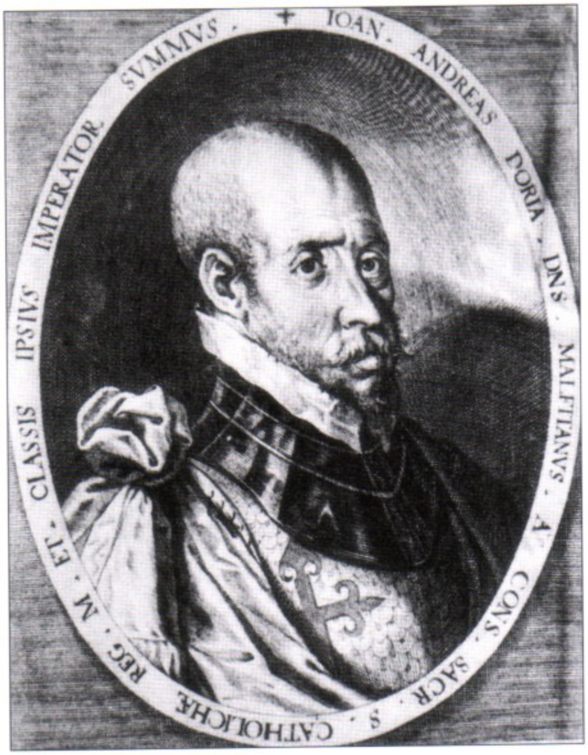
employed tended to be released from service during the winter months, when galley operations were impractical. The employment of *buenas boyas* (a corruption of the Italian term) by the Spanish was seen as a last resort, as their near-constant war with the Barbary pirates demanded that they maintain a permanent naval presence in the Western Mediterranean. The use of galley slaves was the most practical economic solution available. For the most part the Spanish *forzati* were Barbary prisoners, augmented by the sweepings of the Spanish prisons, where a sentence to the royal galleys was seen as a cost-effective option by the Spanish judiciary.

Finally the Ottoman Turks employed a unique system. Free oarsmen were considered preferable to slaves on their rowing benches, and for the most part their fleet was crewed through a levy of their Greek, Dalmatian, Anatolian and Aegean possessions, where men had to serve in the galleys for a set period in lieu of financial taxation. This meant that, although not hard-bitten professional soldiers, at least these men were free, and could swing a scimitar when required. Additionally, *azabs* (irregular light infantry) in the service of the Ottoman army could also be drafted to the galleys as oarsmen when required. Another source was free Christian oarsmen, known as *maryols*, who served in the galleys in return for pay. A typical Turkish galley fleet of the late 16th century would therefore contain vessels crewed by conscripted Muslims, volunteer *maryols*, and slaves. The tendency was to avoid mixing the three groups. Real fighting power on Turkish ships was supplied by drafts of professional soldiers, like the superb Janissaries, who were arguably the best infantrymen of their day, and certainly were able to hold their own against the elite of the Christian powers: the Knights of St John and the veteran Spanish *soldados*.


+ IOAN . ANDREAS . DORIA . DNS . MALFTIANVS . A . CONS . SACR . S . CATHOLICHE . REG . M . ET . CLASSIS . IPSIVS . IMPERATOR . SVMMVS .

Andrea Doria (1466–1560), the elder of two Genoese galley commanders of that name. He encouraged Genoa to support Spain from 1528 on, and he commanded the joint Christian fleet which fought at Prevesa (1538).

In all Mediterranean fleets, conditions for the galley slaves were usually appalling, and those of free men were little better. Slaves could not be expected to row effectively without supervision, so one free man was often assigned to each bench, on the inboard end of the oar, where he set the tempo for the rest to follow. Conditions in these rowing benches were bad enough for the unfettered oarsmen; for the slaves, conditions would have been horrific. Offered little in the way of clothing to protect their bodies from the sun, heat-stroke, exhaustion and injury would have been commonplace. Even worse, by being chained permanently in place, the opportunities for personal hygiene were minimal, and excrement and sweat would have made the stench on board almost unbearable. Northern European observers claimed that you could smell a galley a mile to leeward, and certainly the use of fragrances and scents by the officers to hide the smell on board was recorded in both literature and letter.

In theory, each galley was owned by its particular state, although mercenary galley commanders and venture investors who hired the

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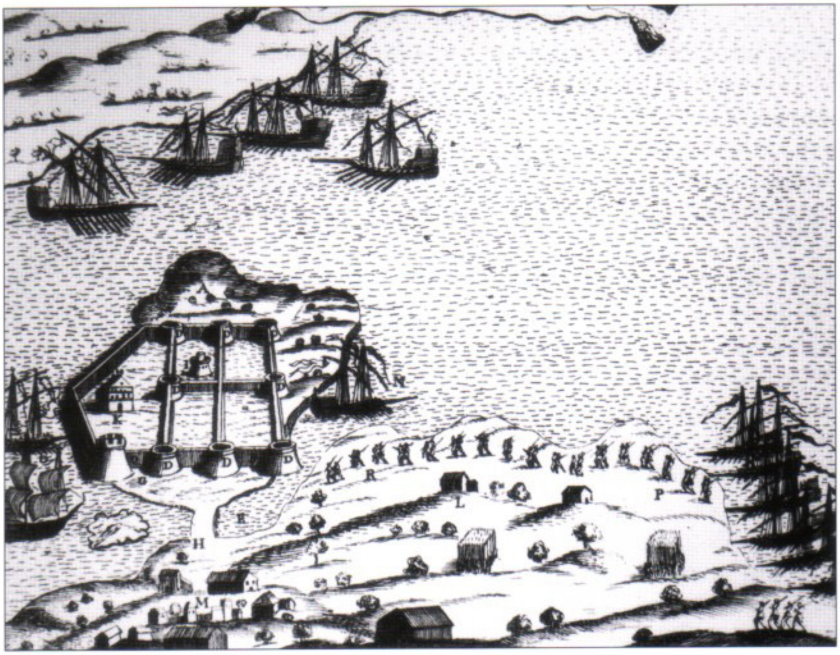

The capture of the fortified town of Prevesa by a Venetian expedition, c.1560. The port was the backdrop to a large galley battle in 1538, when a smaller Turkish force commanded by Barbarossa defeated Andrea Doria, the Christian admiral.

galley for a particular cruise as a business venture were still to be found, as they appear on various debenture books. The greatest of these was Gian Andrea Doria (1539–1606), the grand nephew of the Genoese *condotierre* of the same name who had sold his services (and those of Genoa) to Spain in 1528. Andrea Doria hired out twelve galleys to the Spanish during the late 16th century, and profited from the venture both financially and through the gathering of offices and trade concessions. This was an exception, and in most cases during the period, a galley commander was appointed by the state, albeit he was usually appointed as a result of buying his position (in the case of the Spanish), or through family connections (as in Venice). The galley commander was permitted to select his own officers and men, having been given a bounty to raise the galley's crew, according to a set list of pay rates, crewing levels and responsibilities.

The best source of information on this organisation comes from a Spanish document dated to 1539, giving rates of pay, titles and numbers of a typical Spanish ordinary galley. The *capitán* was in overall command, assisted by a *patrón* (sailing master). Traditionally the commander was a nobleman, who could not necessarily be expected to know much about galleys and the sea. Consequently the *patrón* was responsible for the day-to-day running of the galley. He was assisted by the *sotapatrón*, the *comitre* and the *sotacomitre* (mates), and by two *consejeres* (pilots). The *remolar* (rowing chief) was in charge of the *ciurma*, together with his assistant, the *ayudante de remolar*. Next came the *maestre de hatcha* (carpenter), *calafate* (boatswain), the *botero* (cooper) and the *alguacil* (sergeant-at-arms – also in charge of water and provisions). One *lombardero* (gunner) was carried for each large gun, and if a gun crew was needed, soldiers would be detailed off to assist the gunners as required. The *marineros* (sailors) were divided into ordinary seamen and *aliers, nocheres* or *preoles* (able seamen), and the 50 *soldados* (soldiers) were listed according to the type of weapon they carried (half-pike or arquebus). Finally the galley carried 144 *remeros*

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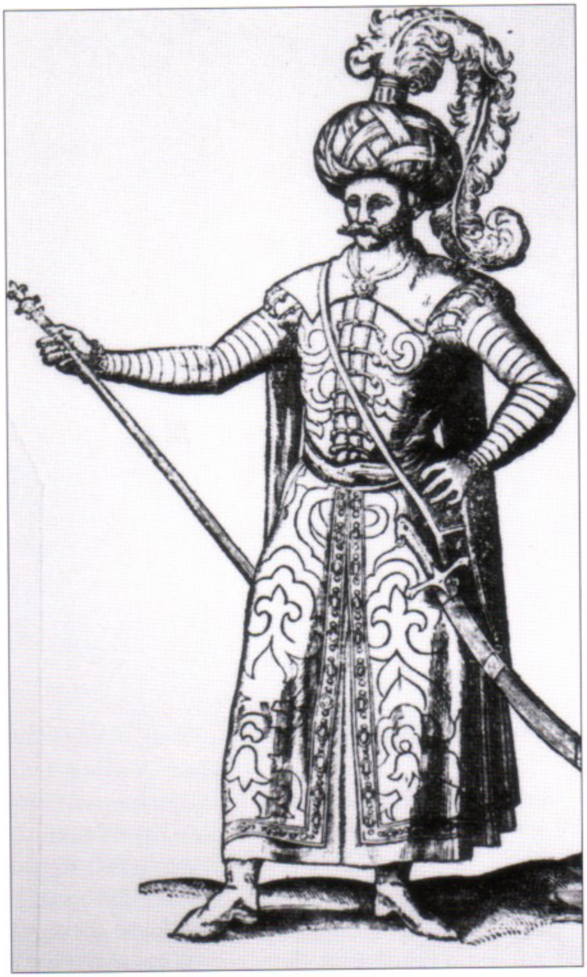
(oarsmen), with three men to the oar. While the *marineros* were free men (and were paid a wage of two escudos per month), the *remeros* were *forzati*, and were paid nothing. Unlike Italian or Turkish galleys of this kind, no free men appear to have been assigned to each oar, as the number of unpaid rowers matches the 24 banks of the craft.

The one abiding feature that emerges from any study of galley warfare was the close link between the financial organisation of the Mediterranean states, and the organisation of the galley fleets. These oared warships were crewed according to the dictates of financial expediency, tempered by the strategic and tactical doctrines of the various maritime states. Galley warfare in the Mediterranean was unlike any other form of naval warfare of the period, due to the strange balance between war and economy. As an example, the Venetians were usually reluctant to wage a protracted war against their arch-enemies the Ottoman Turks, as it disrupted their trading links with the ports of the Eastern Mediterranean, a trade which was the staple of the Venetian economy. They participated in joint campaigns with other Christian powers, but were reluctant to wage war on their own. The French provided a siege train to the Turks when they attacked the Spanish-held port of Tunis in the early 16th century, an act which was unjustifiable in terms of a religious war, but completely understandable in the face of bitter Hapsburg-Valois rivalry in Italy. It seems as if the rules which applied to warfare in the Mediterranean were both complex and unique, a by-product of an equally complex and fragile economic structure. This unique approach to galley warfare also influenced the strategic role of the galley fleets, and the tactics used by the various Mediterranean powers.



Turkish galley commander, dating from the time of Lepanto. German woodcut by an anonymous artist, c.1575. His seemingly impractical garb actually gave the wearer great freedom of movement in battle.

TACTICS

To understand the nature of galley warfare, we need to try to ignore existing preconceptions about naval warfare. In the first place, galleys were not naval vessels in the modern sense, but were amphibious tools of a style of warfare which involved land as well as sea combat. Galleys were used to launch amphibious raids on enemy coastlines, to support the landing of friendly troops on a hostile shore, to bombard enemy shore positions, and to resupply or reinforce troops whose flank rested on the shore. In this last role galleys were frequently used as fast transports, rather like the way the Japanese used their destroyers of the 'Tokyo Express' during the Guadalcanal campaign of 1942. In other words, to the galley commanders of the Renaissance, the ability to land troops on a Mediterranean beach was as important as the ability to maintain a

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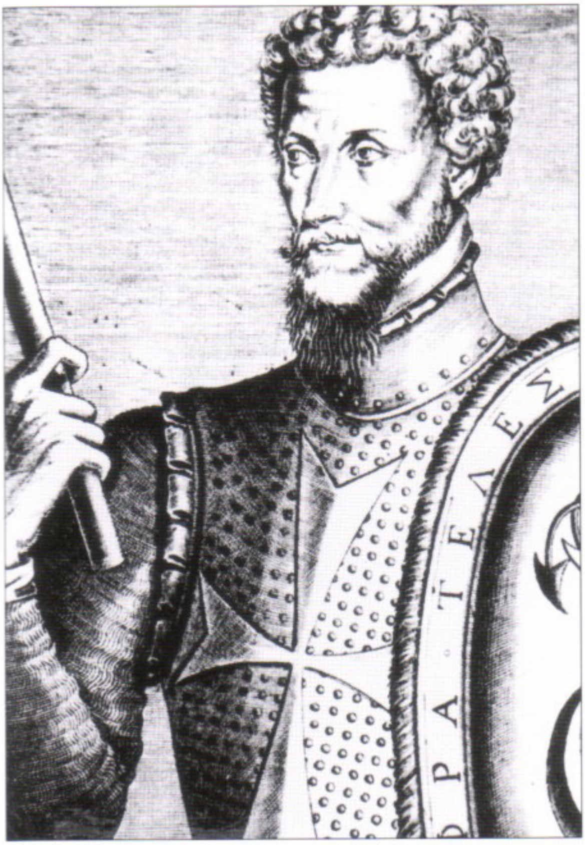
powerful gun battery. Fights between galley fleets were rare, and the 'little war' fought during much of the period was more likely to involve the support of land operations or raids on an enemy coast than a fully-fledged naval campaign in the modern sense. To these commanders, the galleys themselves were less important than the men and the guns they carried. The galley was expendable, and it was sacrificed if required, as long as its crew was able to escape to safety. Part of the reason for this was financial. A Spanish galley in the 1530s cost approximately 2,300 ducats to build. It cost 577 ducats a month to equip, provision and pay its crew, making the annual running costs of the ship approximately three times its value at 6,924 ducats.

The other crucial element in galley warfare was its close link to strategy. Following the fall of Constantinople in 1453, the Ottoman Turks were on the offensive, driving the Venetians and the remnants of the Holy Orders from the Aegean Sea and the Eastern Mediterranean. Galley warfare was all about bases, and as the range of galleys was limited by the lack of provisions and water, this meant that in order to be effective, galleys had to have bases no more than four days' sail or row apart. Blockades of an enemy coast were virtually impossible, and without secure bases, and sheltered ports in case of sudden storms, galley fleets were forced onto the defensive. Strategy therefore revolved around the capture of bases, and consequently when the Ottoman Turks captured the southern Greek port of Croton, they were able to encroach into the Adriatic.



Leone Strozzi, the Genoese commander of the French galley fleet during the mid-16th century. Like many Italian noblemen, Strozzi was a naval *condotierre*, selling his services to the highest bidder.

Another vital aspect was the slow pace of galley warfare. It has been estimated that a Venetian *galia sottil* rowed in the *alla sensile* fashion with 24 banks of oars could achieve a speed under oars of about 7 knots. It was impossible to sustain this speed for more than an hour, as the oarsmen became exhausted. Consequently galleys operated at even slower speeds to preserve the energy of the *ciurma*. This was true in both tactical and strategic terms, and fleet commanders would often use sails to preserve the energy levels of their oarsmen. A cruising speed of around 4 knots under oars is a reasonably accurate estimate. Galley captains also needed to keep a reserve of the rowers' energy for 'dash speed'. A good crew could row about 235 yards a minute (Guilmartin, *Gunpowder and Galleys*, 1974), and this speed could be sensibly maintained for up to 20 minutes without completely exhausting the *ciurma*.

Apart from speed under oars (sails were rarely used in combat, unless to aid flight), the main arbiter of galley tactics was firepower. The range, effectiveness and rate of fire of a galley's main battery determined how effective she would be in action. Certainly, boarding tactics were commonplace, but commanders were understandably reluctant to board an enemy vessel before reducing its effectiveness with artillery fire first.

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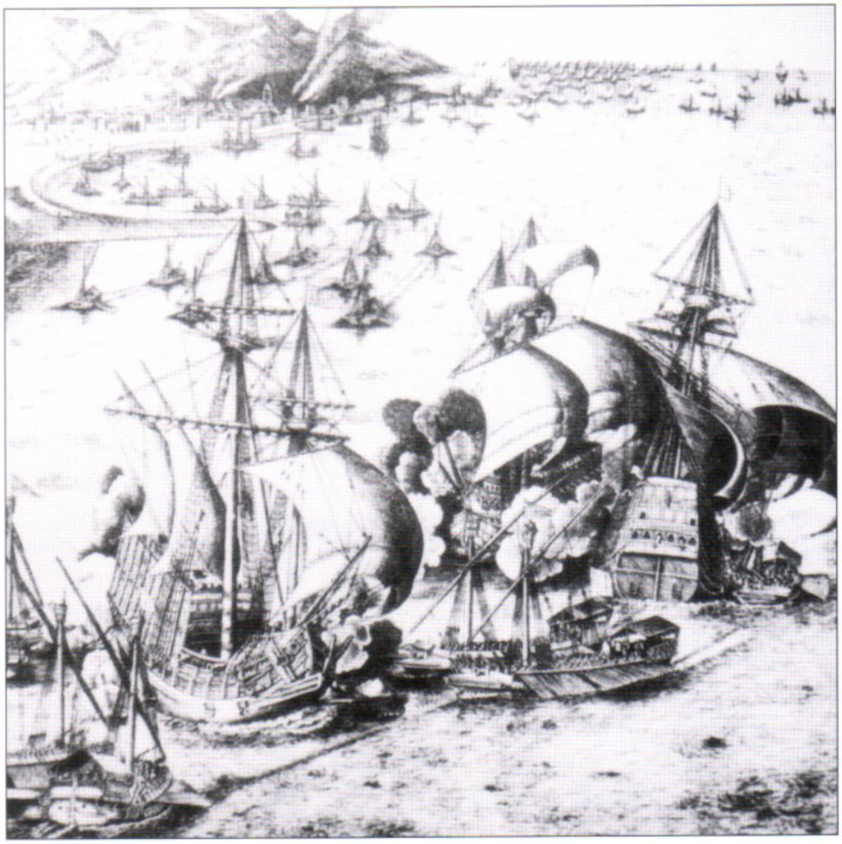

In this woodcut dated 1561 and attributed to Pieter Brueghel the Elder (1525–69), three sailing carracks are shown locked in a conflict with a squadron of galleys. Actions of this type would be fought at far greater ranges, as the Turkish galleys were vulnerable to small-arms fire from the loftier sailing warships. (Mel Fisher Maritime Museum, Key West)

Rather like a fighter aircraft, a galley had to fire directly forward, aiming its ordnance by pointing the vessel at the enemy. Although some of the larger centreline guns could at least in theory fire a ball a mile or more, the effective range of even the largest guns was no more than 500 yards (according to 16th century artillery manuals). Smaller guns would have a proportionately shorter effective range. At 'dash speed' a galley could close this distance in under two minutes, less time than it took to reload a heavy piece of muzzle-loading ordnance. This meant that if one side was determined to force a head-on boarding action, its opponents could only fire off one shot each before the opposing ships came into contact.

Once a boarding action had started, reloading the main battery was virtually impossible, as the fighting would almost certainly be concentrated around the gun platform. Similarly, with a one shot opportunity, captains were unlikely to want to waste their one effective discharge, so they would usually elect to reserve fire for as long as possible. Ideally, the guns would be fired just as the two vessels came into contact. In these circumstances, while roundshot would cause incredible damage to the *ciurma*, diced shot (canister shot) would prove the most effective against the enemy guns and boarding party.

While galleys might stand off and fire at each other at maximum effective range, this was unlikely, unless they were formed into a fleet, and neither side wanted to break its defensive formation. Clearly, by arraying galleys alongside each other with their bows pointing at the enemy, the maximum firepower could be delivered, while the chances of being rammed in the vulnerable flanks would be reduced. In these circumstances, galley fights such as Lepanto would either degenerate into long-range artillery duels, or more likely would lead to point-blank firing, then a massed mêlée, with both lines of galleys clashing. In that battle, the Christians used galleasses as virtually impregnable redoubts, and managed to break up the Turkish line as the two sides closed to contact. In these circumstances, the side with the greatest number of troops would most likely emerge victorious, unless one side managed to tip the tactical balance by holing an enemy ship and causing a gap in the enemy line.

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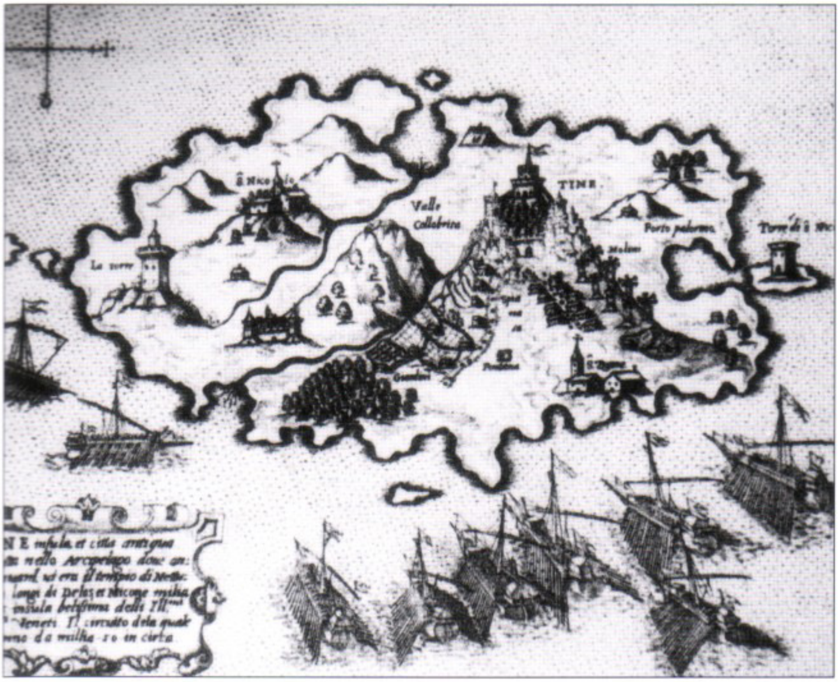
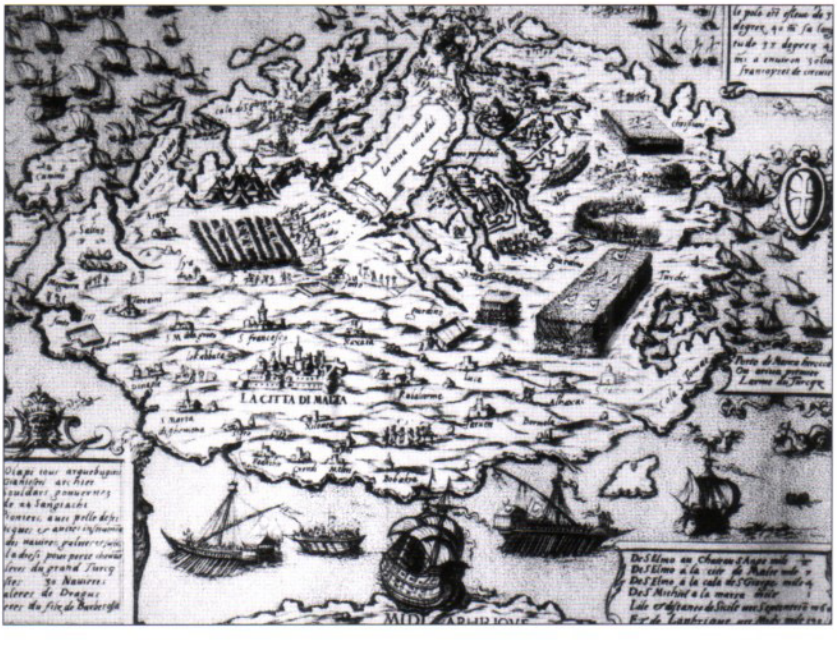


A Venetian attack on the small Aegean island of Tinos, a Turkish stronghold in the region. The engraver has taken pains to show the island's defences, including two small artillery towers, sited to protect the island's two harbours. A 17th century Italian engraving.

Controlling a fleet in these circumstances was exceedingly difficult, and commanders needed to issue orders and organise their fleet before a battle, as once the action began, they had little effective control over events, save for committing reserves. To this end, both Turkish and Christian commanders issued standing orders. A Spanish example from the 1530s covers preparing a galley for action, fleet handling, the manner in which the battle would be fought, and the battle itself. It states that the captain of a galley should 'fire his bow guns' just before boarding, and bigger ships should immediately close the enemy, as they enjoyed a significant advantage in fighting a boarding action. In battle, 'The heavy artillery will begin, firing not too high… As the fleets close the smaller guns will fire, and then, when about to make contact, use all sorts of fire and let the trumpets sound.'

Once the mêlée started, it would be virtually impossible to back water and withdraw in good order. Instead, commanders used *fustas* and *bergantines* to transfer troops to a threatened sector, and tried to keep a reserve to cover any retreat if necessary. Failure to keep in line abreast



The Turkish attack on Malta in 1565 was a defining moment in Mediterranean history, and the Turkish defeat there marked the high-water mark of Muslim maritime conquests. The Turkish fleet is shown approaching the island in the upper left, while an array of Turkish galleys is depicted in the foreground of the map.

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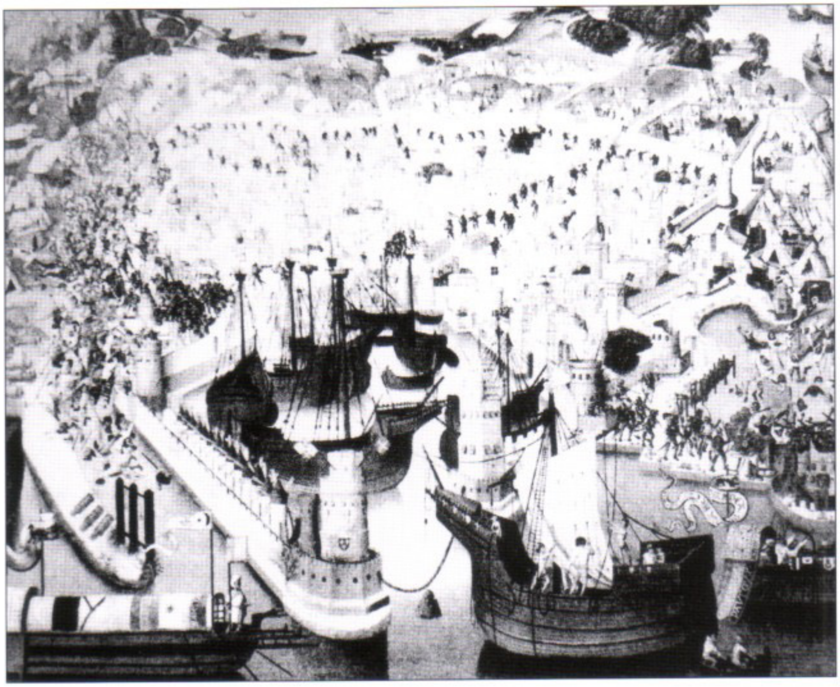
would allow an enemy galley to break formation and ram an exposed galley in the flank, and lighter *galiots* would then come into their own, hovering on the flank of a formation, waiting for an opportunity to strike.



The Turkish capture of Rhodes in 1522, from a contemporary illustration. The amphibious attack on the island saw the use of concentrated artillery fire from galleys in support of troops on the shore. Miniature, mid-16th century. (Musée d'Amiens)

As for the differences between the various maritime powers, the Turks tended to adopt a defensive position when threatened, even to the extent of beaching their galleys stern first, so that their batteries pointed out to sea at the enemy. This was a particularly useful tactic when troops on shore could support the galley fleet. They were expert at combining maritime and land elements, as demonstrated at Prevesa (1538), and at Djerba (1560). The Venetians placed an emphasis on speed, manoeuvrability and firepower, preferring to stand off and fire at an enemy rather than risk a boarding action. By contrast the Spanish invited close combat, and their powerful suites of ordnance were designed to fire a single volley, before sending in the well-trained Spanish infantrymen to finish off their opponents. Although the most effective combination in battle, this emphasis on mêlée strength and firepower was balanced by a lack of manoeuvrability, making them vulnerable to attack by more agile opponents. The Barbary corsairs used their craft for raiding, and attacking isolated merchantmen. Consequently they placed an emphasis on speed rather than firepower, and preferred to close and fight a mêlée with their well-crewed vessels rather than risk a stand-off fight, which might damage their own vessels and the potential prizes. Other maritime powers had less clearly defined tactical doctrines and vessels adapted to their strategic needs. With such vulnerable craft, a mistake could prove fatal, and while large galley fights could be indecisive, smaller engagements were frequently bloody, as once committed, one side usually had to lose.

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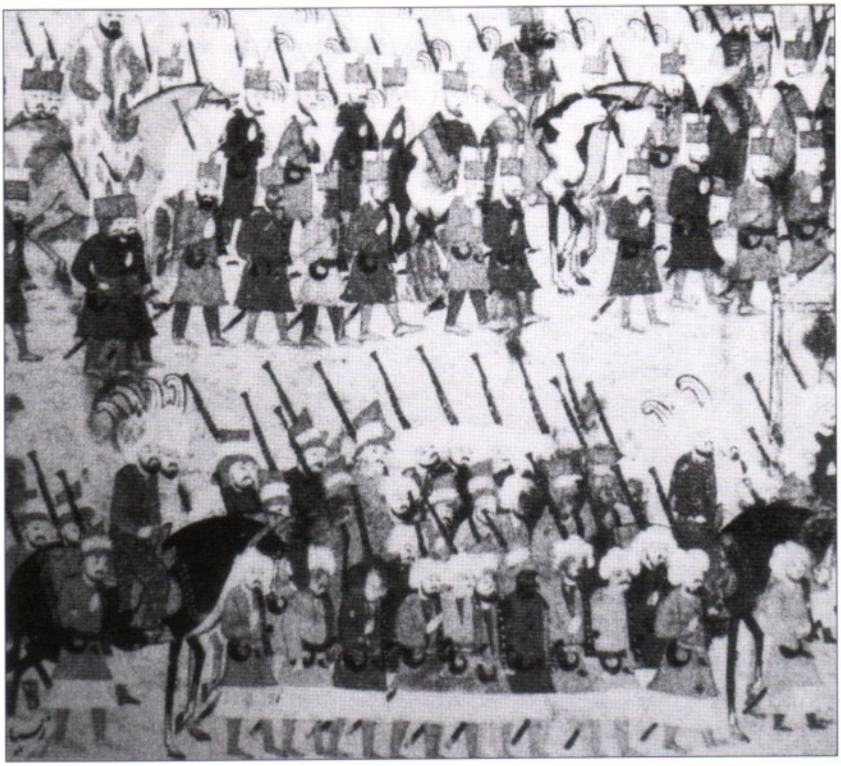

Ottoman troops on the march. The Turks made extensive use of their well-trained regular troops during their naval campaigns. Veterans of hard-fought campaigns in the Balkans and Greece, these troops gave the Turks an advantage over many of their Christian opponents in boarding actions. (Topkapi Museum, Istanbul)

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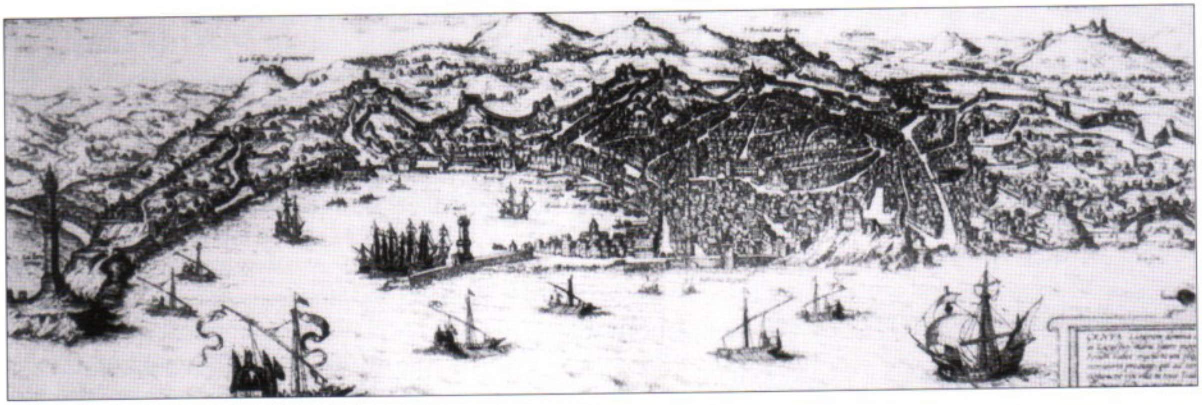
COLOUR PLATE COMMENTARY

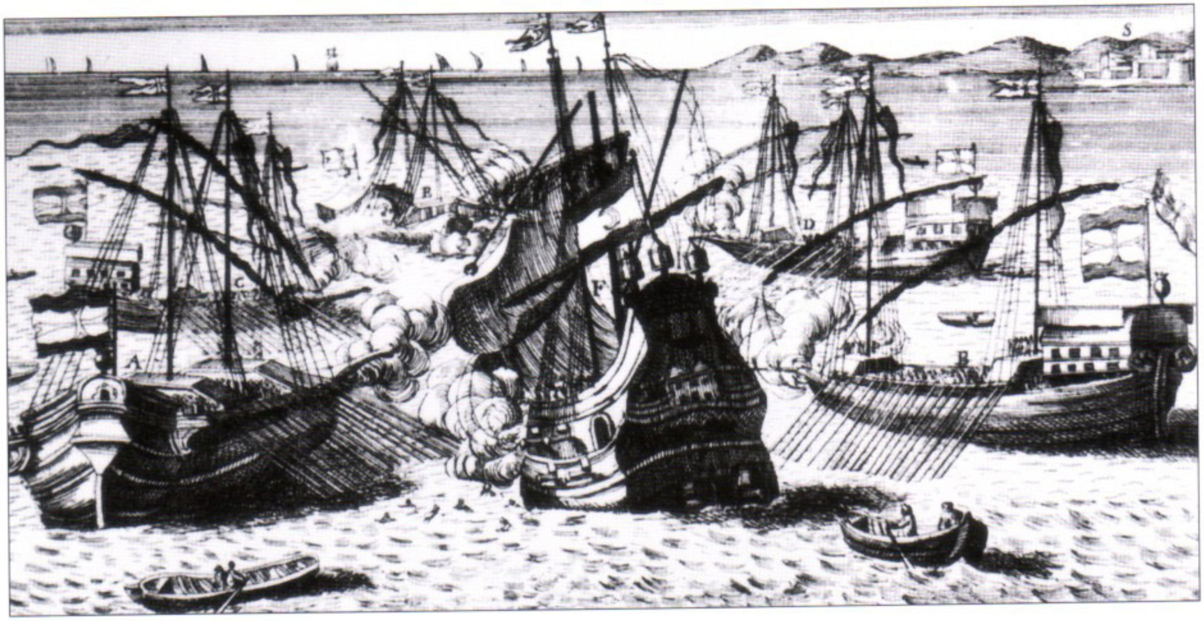
A: A VENETIAN *GALIA GROSSE*, C.1500

The *galia grosse* was the premier Mediterranean merchant vessel of its day, first making an appearance in Venice during the late 13th century. It was primarily designed to carry high-value and low-bulk cargoes between Venice and the Arab ports of the Eastern Mediterranean, such as spices and cloth. It soon became associated with the transportation of pilgrims to and from the Holy Land, but merchant galleys also sailed between the Mediterranean and northern Europe, particularly Flanders. These vessels had a higher freeboard than most other oared vessels, making them particularly useful as warships. They were duly pressed into service as auxiliaries by the Venetians in time of war, and by the mid-15th century their ownership had been assumed by the Venetian government, who operated them as a state-run monopoly. Ship owners bid for the use of the vessels, and in return, had to supply them with men and weapons when called upon. During the 15th century the typical armament of crossbowmen, archers and swordsmen was augmented by a small number of swivel guns. By the late 15th century the first pieces of heavy ordnance had begun to appear on Mediterranean warships. The inset shows the conversion of a *galia grosse* to carry a large bombard by removing the foremast. Note the grouping of the oars in threes, a style



ABOVE **The Italian city state of Genoa in the mid-16th century. At the start of the century the port was the home port of the French galley fleet, but Genoa changed its allegiance to Spain in 1528. Engraving from anon., *Civitates orbis terrarum*, 1572.**

BELOW **'The sinking of a Turkish ship'; a mêlée between a squadron of galleys bearing the emblem of the Knights of St John and a Muslim sailing warship. In most cases, well-armed sailing ships were able to fend off attacks by galleys. Engraving from Leonard Fronsberger's *Kriegssbuch* (Frankfurt-am-Main, 1573).**



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indicative of the *alla sensile* rowing system used by the Venetians until the middle of the 16th century.

B: THE BATTLE OF PREVESA, 1538

While the galley as a warship type dominated the Mediterranean for centuries, the introduction of gunpowder into sailing warships threatened to end this supremacy. Put simply, while galleys were designed as vessels which fought boarding actions, the large armed sailing vessels of the 16th century were difficult to assault in this way. A well-armed carrack (or 'roundship) could usually hold off an attack by galleys using its main ordnance, and use its manoeuvrability under sail to foil any boarding attempt. Its one drawback was its reliance on the vagaries of the wind, and if it was becalmed, it became vulnerable. This was the situation at the Battle of Prevesa (27 September 1538), when a Christian fleet containing both galleys and roundships was attacked by a smaller Turkish galley fleet commanded by Khaireddin Barbarossa. The wind had dropped during the day, leaving the sailing warships isolated, and Barbarossa's galleys encircled them, and bombarded them from all sides. As a Spanish witness recalled: 'Barbarossa...began to bombard our roundships and they to reply to him. He sent to the bottom one of our ships with 300 Spanish soldiers. He took a galley of the Pope without resistance. He took another of the Venetians. He destroyed another Vizcayan roundship in which were 400 Spanish soldiers.' The scene shows the defence of the Venetian 'Great Galleon' commanded by Patron (captain) Bondulmierus. He fought off Turkish assaults all afternoon, and escaped towards the evening as a light wind arose, and carried his battered roundship to safety.

C: A BARBARY *GALIOT*, C.1540

The towns lining the northern coast of Africa were known collectively as the ports of the Barbary Coast during the 16th century and later. They provided a secure base for the Barbary corsairs, a collection of Muslim 'privateers' who preyed on Christian shipping in the Western Mediterranean, and who launched frequent raids on the Italian, Spanish or Sicilian coastlines. The term 'corsair' is derived from the Italian corse (privateer), but the appellation pirate is more commonly (and inaccurately) applied to these adventurers. Each of the Barbary ports was ruled by a local ghazi, who often owned his own corsair fleet, and dispensed licences to others. The whole corsair system was strictly regulated; plunder was turned over to a prize court, and ships originating in friendly states were theoretically returned to their owners. For much of the 16th century these corsairs harried the Italian coast in search of slaves, and consequently the coastal population dreaded them.

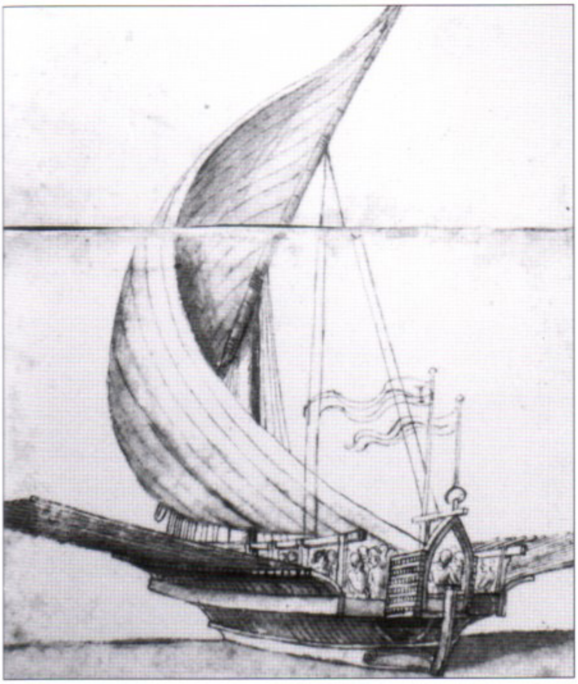
The perfect craft for these raids was not the full-sized war galley, but rather the smaller oared vessels, such as the *galiot*. Although *galiots* were used throughout the Mediterranean as scouting or raiding craft, and as despatch vessels, the Barbary corsairs particularly favoured these light, fast scaled-down versions of the regular galley. They were shallow-drafted, meaning they could be beached virtually anywhere, and unlike in their larger craft, the majority of the oarsmen in a Barbary *galiot* were free Muslim corsairs, not galley slaves. The vessel shown here carries a single large centreline gun, flanked by two smaller pieces, and is painted in the style of an early 17th century Dutch painting showing a Barbary *galiot* in action.

D: A SPANISH *LANTERNA*, C.1571

The flagships of the admirals commanding galley fleets were known as *lanternas*, after the three large stern lanterns which were fitted behind their poop deck, and which were used for signalling and for night-time identification. They were also a recognised symbol of command. These flagships were usually amongst the biggest vessels in a fleet, larger than the *capitanas* and *almirantas* which served as squadron or contingent flagships. This vessel is a reconstruction of *La Reale* (the royal galley), the flagship of Don Juan of Austria (1547–78). This Spanish commander was the General Capitano della Lega (Captain General of the Fleet) of the Holy League during the Lepanto campaign of 1571. The illegitimate half brother of Philip II of Spain (1556–1600), he fought in the centre of the Christian fleet, where the fighting was fiercest. His crew fought a private duel with the Turkish fleet flagship Sultana, commanded by Ali Pasha, until the Muslim commander was killed in action and his flagship withdrew.

This enormous galley had 30 oars per side, each pulled by six *remeros* (oarsmen), a total of 360 men. In addition she carried 320 veteran arquebusiers, and 80–100 gentlemen adventurers, as well as her *officiales* (officers) and *marineros* (sailors).

Her ordnance suite is particularly impressive, with a full 6,000-pound *cañon* on the centreline (equivalent to an



This rendition by André Zysberg of an original watercolour by Raphael (1483–1520) shows a *galiot* rigged for sailing, with its oars raised and secured by rests. The crew are busy handling the sail as the vessel tacks into the wind. (Salamander)

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English 'cannon of eight [inches]', firing a 48-pound shot). This piece is flanked by two media *culebrinas* (3,000-pound pieces firing a 12-pound shot, equivalent to an English 'demi-culverin') and further outboard, two *sacres* (1,500-pound pieces, firing a 6-pound shot, equivalent to an English 'saker'). In addition a variety of *versos* and *esmeriles* (both types of swivel gun) are shown mounted at various points around the ship.

E: A PAPAL *GALIA SOTTIL*, C.1560

The *galia sottil* (ordinary galley) was the mainstay of the galley fleet, and was far and away the most numerous oared warship type in the Mediterranean during the Renaissance. Vessels built from Constantinople to Barcelona all retained certain similarities of design, appearance and even performance, but national strategic doctrines influenced the way these craft were operated and fought. Originally, free men rowed Italian galleys, and the oars were grouped in banks of three, in the *alla sensile* fashion. As inflation led to the spiralling cost of mariners (a typical oarsman's wages rose from one ducat per month in 1511 to 10 ducats in 1570), the maritime powers were forced to look elsewhere for labour. Many elected to use *forzati* (slaves), which inevitably meant a drop in the ability of the oarsmen.To compensate in part for this change, most nations went over to the *alla scaloccio* system, where several oarsmen were used to power a single oar. The most visible difference between the two systems was that in the new method, the oars were equally spaced along the hull, rather than grouped in bunches of three. *Forzati* could be used, with one *di buona voglia* (free man) attached to each bank, to call the stroke. Three men per oar was common, and later a fourth oarsman was added to increase speed at the expense of the galley's range.

The Papacy was an early advocate of the use of *forzati*. As early as 1511 convicts were being released from prison to serve as oarsmen in Papal galleys. This vessel has already added an *arumbada* (fighting platform) over its gundeck, reducing speed in exchange for fighting power, but the fiscal constraints of the Papal State ensured their galleys were not as well provided (or encumbered) with soldiers as were their Spanish allies.

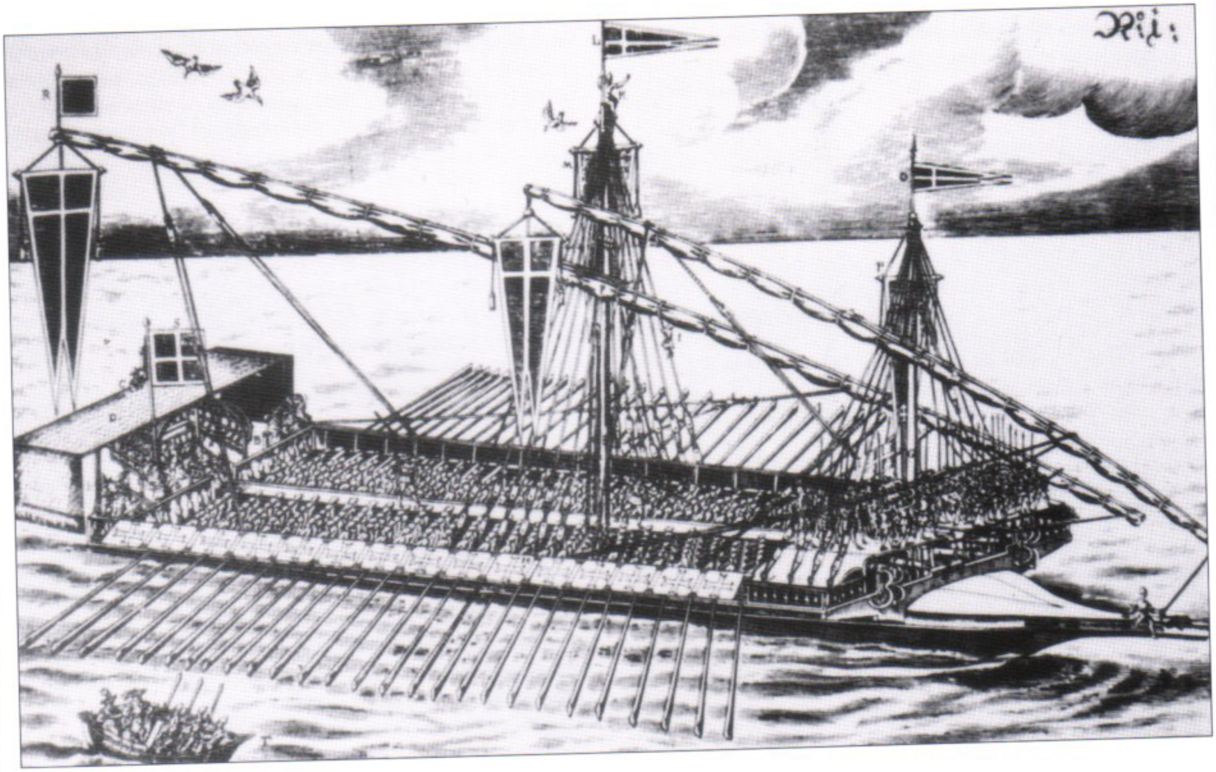
F: THE BATTLE OF LEPANTO, 1571

The Battle of Lepanto (7 October 1571) was seen as the climax of the maritime struggles between Turk and Christian which had dominated the 16th century Mediterranean. Almost 500 galleys took part in the engagement, and when battle was joined the scene was more reminiscent of a brutal mêlée on land than a naval battle.

In a straight head-on clash, both sides would be facing bow to bow, and the fleet commanders would have tried to maintain a tight formation, with their galleys arrayed in line abreast. The presence of several Venetian galleasses in advance of the Christian line broke up the neat formations adopted by the Turks, who broke ranks to row around the lumbering enemy warships.

The battle was fought in three sections, corresponding to the three wings (or *battailes*) of a contemporary army fighting a battle on land. The inshore section of the fight

A *capitanea galea*, or flagship galley, in an engraving from Joseph Furtenbach's *Architectura Navalis* (Ulm, c.1630). This wide, rather cumbersome-looking vessel is powered by 28 banks of oars, each pulled by five oarsmen.



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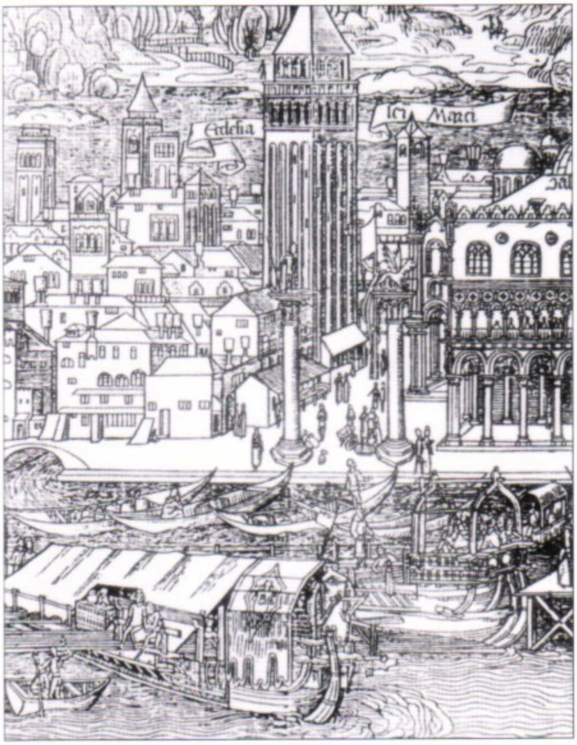


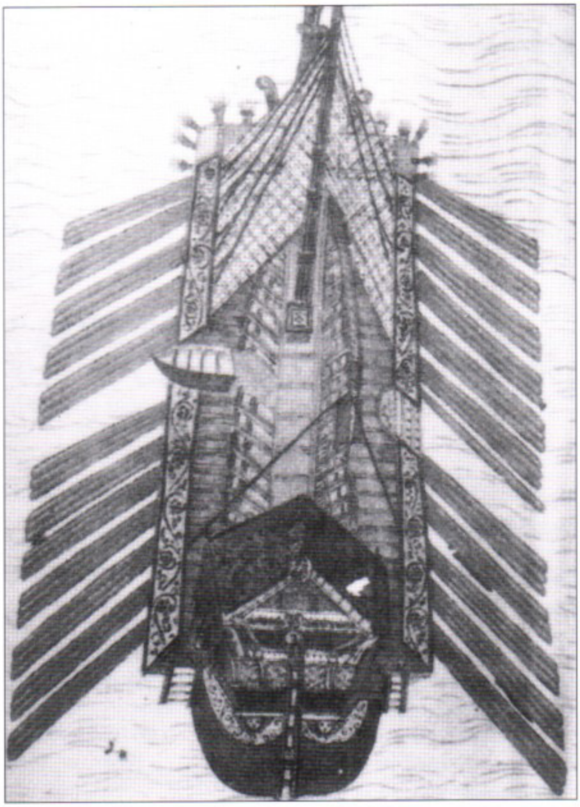
A Venetian merchant galley lying at anchor in Venice, her crew preparing her for a voyage. Detail from an oil painting by Vittore Carpaccio, c.1455–1525. (Gallerie dell' Accademia, Venice)

involved the left wing of the Christians (commanded by the Venetian, Agostin Barbarigo) and the Turkish right wing (under Mehmet Suluk). Part of the Turkish fleet tried to work its way between the Venetian galleys in front of them and the land, catching the Christians in the flank. Several Venetian galleys were sunk before the mortally wounded Barbarigo ordered his fleet to swing round 'like a door', pinning the Turkish galleys against the shore. In a brutal close-range struggle the Turkish squadron was annihilated. The illustration shows the Christian counter-attack, with a *galia sottil* preparing to ram a Turkish galley amidships. The ramming would then be followed by a mêlée on the deck of the damaged Turkish ship.

G: A VENETIAN GALLEASS, C.1571

The galleass was one of the most incredible ships of the period, combining a powerful all-round firepower with the ability to move under oars. A Venetian invention, the first galleasses were converted from *galia grosse* hulls during the late 1520s. These were cumbersome vessels, but although many saw them as sailing vessels, as they carried three masts, these Venetian warships were really a development of the galley, using the hull of the *galia grosse* to create a mobile bastion of wood and guns.

These craft were incredibly cumbersome, and had to be towed on long voyages, while their performance under oars left much to be desired. Despite their lumbering nature, they proved their worth at the Battle of Lepanto, when a handful of Venetian galleasses formed a 'forlorn hope' in front of the Christian line of battle, and managed to disrupt the Turkish fleet as it closed to contact with the main fleet. Their height made them virtually impervious to boarding. Only a sustained attack by several galleys followed by the casting of boarding nets to allow the attackers to climb on board would allow any assailant to come to grips with the defenders. The main point of defence was the forecastle, whose circular form permitted the engagement of targets to the front of the vessel, as well as on either beam. Beneath the forecastle structure a single large centreline gun provided an additional punch. The sides of the galleass also carried an array of smaller muzzle-loading pieces such as *falconettes* (falconets), designed to fire over the heads of the oarsmen, unlike in later Spanish galleasses, where the oars had to be lifted out of the way to give the guns a clear line of fire. Larger pieces were mounted on the poop, where they could cover attacks against the waist, or if required, they could be hauled around and used as stern chasers. The vessel depicted here is the *Santa Maddalena di Venetia* (St Magdalene of Venice), commanded by Marino Contarini, who was killed at Lepanto. The effectiveness of these craft in the battle prompted the Spanish to build their own galleass fleet, and these Iberian vessels saw action in the Azores (1583) and during the Spanish Armada campaign (1588).



In this overhead view of a Venetian galley with its oars grouped to conform to the *alla sensile* system, the gaps between the oars are due to the presence of the ship's entry port and her tender.

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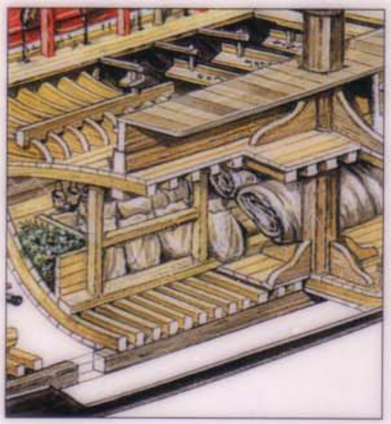

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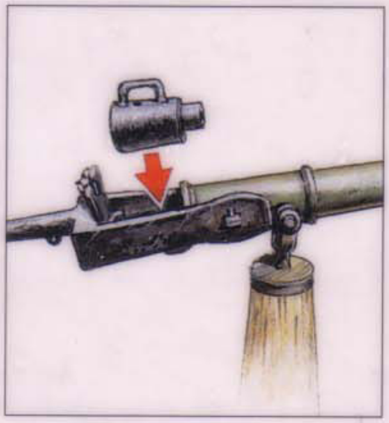

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